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THE LIVER.

WHILE we are still ignorant concerning all the functions of the liver, yet there are two of them concerning which we seem to have some definite information.

1. *The Production of Bile.*—This fluid is produced in large quantities—forty ounces in the twenty-four hours. It passes into the duodenum, thence into the intestinal tract, where part remains and part is reabsorbed from the wall of the intestine into the blood. The portions which remain in the intestine assist in the digestion of fat and peptones, act as an antiseptic to prevent the decomposition of the contents of the intestine, assist in exciting the peristaltic action of the colon, and are finally discharged, mixed with the fæces.

2. *The Chemical Changes Effected in the Blood.*—The blood from the abdominal viscera, charged with the matters absorbed from the intestine, passes through the entire venous system of the liver. While it does this the matters contained in it undergo chemical changes and are separated into excrementitious matters which are eliminated by the kidneys, and other substances which circulate in the blood and nourish the tissues.

FUNCTIONAL DISORDERS OF THE LIVER.

The functions of the liver may be disordered either with or without structural disease of this organ. These disorders may occur by themselves, or be associated with disturbances of the stomach and of the intestines.

The cases may be conveniently arranged in two clinical groups :

1. *Disturbances of the Bile-producing Functions of the Liver.*—The quantity of bile produced is too small. This is followed by imperfect digestion of fats and peptones, and consequent loss of nutrition ; by decomposition of the matters contained in the intestine, with flatulence and possible poisoning ; by constipation.

The patients become anæmic, they are emaciated, or, although remaining fat, are feeble and flabby. The ingestion of fats is followed by distress. They are constipated, with flatulence and its associated pains. The fæces are hard and light-colored. The tongue is coated, the mouth and throat dry, with a bitter taste. The skin is pale and muddy-looking. The appetite is poor and capricious. The urine contains an excess of phosphate and oxalate of lime. There are headache, mental lassitude, abnormal sensations in different parts of the body. In the bad cases hypochondriasis, neurasthenia, hysteria, or melancholia may be developed.

Treatment.—The object of treatment is to increase the production of bile, and this is to be effected by improving the general health, and by using remedies which will increase the production of bile.

In the milder cases the patient should eat meats, vegetables, and fruits, take exercise in the open air, and take one hour before meals a tumbler of hot water with a small quantity of sulphate of magnesia.

In the more severe cases the patients may be so feeble that they will require rest in bed and massage for a time before they can begin to take exercise. They may be so anæmic that it will be necessary to give iron and oxygen. We may use the hot water and sulphate of magnesia, or podophyllin, aloes, rhubarb, ipecac, phosphate of soda, sulphocarbolate of soda, bichloride of mercury, or the mineral acids alone or in various combinations.

2. *Imperfect Chemical Changes in the Blood which Passes through the Liver.*—These patients are able to digest fats and peptones, their nutrition does not suffer. They are often persons who habitually eat and drink too much, or who have the gouty diathesis.

The most marked symptoms are: Feelings of fulness in the head, vertigo, loss of memory, abnormal sensations in different parts of the body, hypochondriasis, sometimes morning diarrhœa. The urine is scanty and high-colored, it contains an excess of uric acid and urates, it may contain small quantities of albumen and of sugar.

Treatment.—The patients should avoid the use of tobacco, wines, spirits, sugars, and starches. They should take active exercise. They are often much benefited by the regular course of treatment at Carlsbad.

JAUNDICE.

This name is used to designate the staining of the tissues by the coloring matter of the bile.

The pigment is found in the urine; it stains the conjunctiva, skin, mucous membranes, viscera, the sweat, and the discharges from wounds.

The presence of considerable quantities of the coloring matter of the bile in the blood is regularly attended with: Constipation, or diarrhœa, and clay-colored stools; imperfect digestion of fats and peptones and consequent loss of nutrition; itching of the skin; a low temperature and slow pulse; hemorrhages in the mucous membranes and the skin; mental dulness, stupor, delirium, or coma.

Jaundice is of two kinds: the obstructive and the non-obstructive.

Obstructive jaundice is due to some mechanical impediment to the passage of the bile from the liver to the duodenum. The bile, being unable to escape from the liver, is reabsorbed from the biliary passages and passes into the blood. Such an obstruction of the common or hepatic duct may be caused by:

1. Biliary calculi, inspissated bile, mucus, hydatids, distomata, or foreign bodies from the intestine in the bile-ducts.

2. Inflammation of the common bile-duct, or of the duodenum.

3. Congenital malformations, peri-hepatitis, and ulcers of the duodenum.

4. Tumors of the common bile-duct, or of the duodenum.

5. Pressure on the bile-ducts from without by tumors of the liver, of the glands, of the stomach, the pancreas, the kidney, the omentum, the uterus, and the ovaries; by aneurisms, by impacted fæces.

Non-obstructive jaundice occurs with:

1. The infectious diseases, especially their more malignant forms.

2. With the bites of poisonous serpents.

3. With poisoning by phosphorus, mercury, copper, and antimony.

4. Occasionally after inhalations of chloroform and ether, after marked mental emotions, and with concussion of the brain.

This form of jaundice, apparently, gives no symptoms.

The current explanation of its development is that the bile is formed, passes into the intestine, and is reabsorbed into the blood, as usual; but after being reabsorbed into the blood in this way, the regular chemical changes which dispose of the coloring matter of the bile do not take place, so this coloring matter circulates unchanged in the blood throughout the body.

SIMPLE JAUNDICE.

Lesions.—There is a catarrhal inflammation of the common bile-duct alone, or associated with this catarrhal duodenitis, or gastritis. The inflammation is attended with so much swelling of the mucous membrane of the bile ducts as to obstruct the flow of bile from the liver into the intestine.

Symptoms.—The patients suffer from general malaise, headache, dulness, sleepiness, vertigo. The tongue is coated, there is loss of appetite, nausea, and vomiting. The bowels are constipated and the fæces clay-colored. The urine is pigmented; there may be a febrile movement. There may be pain over the duodenum. There is a good deal of itching of the skin.

If the bile-duct alone is inflamed the cases run a mild course. The one symptom is the jaundice. The patients are not confined to bed, the cerebral symptoms are slight, there is no vomiting, and no fever.

If the duodenum is inflamed as well as the common duct the prostration is more marked. There is often a good deal of pain, referred to the duodenum. Nausea, vomiting, and a febrile movement are absent, or not severe.

If the stomach also is inflamed the condition of the patients is much worse. They are often confined to bed. There may be stupor and delirium. Nausea, vomiting, and a febrile movement are regularly present. The symptoms of the gastritis may precede by several days the appearance of the jaundice.

When gastro-duodenitis with jaundice occurs in a person who already has a fatty or a cirrhotic liver, it is often fatal.

Treatment.—These cases are commonly treated with alkalies, purgatives, and calomel. The most efficient treatment, however, seems to be the use of ice-water enemata. A quart of ice-water is to be slowly introduced into the rectum, retained for ten minutes, and then passed. This should be done once or twice a day.

CHRONIC JAUNDICE.

Although cases of simple jaundice usually run their course within a few weeks and recover, yet they sometimes last longer. In these protracted cases the disease is apt to behave in one of three ways:

1. All the symptoms continue with a steadily increasing jaundice. The patients lose flesh and strength, there are bleedings from the mucous membranes and in the skin. The patients die, after several months, emaciated and deeply jaundiced.

2. The patients suffer from repeated attacks at short intervals of gastro-duodenitis and jaundice. Between the attacks they seem almost well, but yet there is always a little bile in the urine.

3. The jaundice continues, but does not increase. The patient's general health remains comparatively good. After a number of months the jaundice finally disappears.

ACUTE DEGENERATION OF THE LIVER.

Acute yellow atrophy of the liver.

Malignant jaundice.

This seems to be an acute infectious disease, with degeneration of the liver as its characteristic lesion.

Lesions.—The liver may be at first somewhat enlarged and then become smaller, or it becomes smaller from the first. The diminution in size is very rapid, and goes on until the liver only weighs one or two pounds. These very small livers are yellow and flabby.

In other cases the liver is not much diminished in size, its consistence is firm, its color is mottled red and yellow.

In all cases there are most extensive changes in the hepatic cells. They become swollen, coarsely granular, and finally disintegrate and break down.

The disease may occur in persons who already have a cirrhotic or a fatty liver.

The spleen is large and soft.

The stomach is the seat of acute catarrhal inflammation.

In the intestines the solitary and agminated glands are swollen.

The kidneys are the seat of acute degeneration of the epithelium.

The muscles of the heart undergo fatty degeneration.

There are extravasations of blood in the skin, the mucous membranes, and the serous membranes.

Causes.—The disease has been observed in persons between the ages of one and sixty-nine years, but it is most common in persons between twenty and thirty years of age. It is more common in women than in men, and especially in pregnant women.

Symptoms.—The invasion of the disease is gradual or sudden.

If it is gradual, the patients suffer from nausea, occasional vomiting, general malaise, sometimes jaundice for from three days to three weeks.

If it is sudden the patients at once become seriously ill with rapid development of all the symptoms of the disease.

When the disease is established, there is frequent vomiting, first of food, then of brownish fluid, coffee-ground matter and blood. There is diarrhœa with clay-colored fæces and later bleeding from the intestines. Jaundice in two-thirds of the cases appears early in the disease, in one-fourth of the cases from the fifth to the seventh day, in a few cases not until one or two days before death, in very rapid cases there may be no jaundice. There may be pain over the region of the liver. There is a febrile movement during the active period of the disease, but the temperature runs an irregular course, sometimes very high, sometimes falling below the normal. The pulse becomes rapid and feeble.

There are cerebral symptoms—headache, alternating stupor and delirium, general convulsions, and coma.

The tongue becomes brown and dry; the prostration is very marked.

The liver may at first be enlarged and then become smaller, or it may become smaller from the outset. The diminution in size, as we mark it out by percussion, is very rapid, until the liver dulness may entirely disappear. In some cases, however, the liver remains throughout the disease of nearly its normal size.

The urine contains bile-pigment, albumen, casts, blood, leucin, and tyrosin. The urea and uric acid are diminished in quantity.

There are often hæmorrhages from the stomach, intestines, and kidneys, and in the skin.

The ordinary duration of the active symptoms is a week, but a prolonged period of invasion may lengthen the whole time of the disease to four weeks, and the malignant cases may die within twelve hours.

The Prognosis of the disease is very bad.

CIRRHOSIS OF THE LIVER.

Lesions.—Cirrhosis of the liver is a chronic interstitial hepatitis with a production of new connective tissue. This new tissue follows the distribution of the stroma of the liver. It surrounds large or small groups of acini, or single acini, or grows diffusely between the liver-cells, or is in the form of large bands and masses. Accordingly the liver is coarsely or finely nodular, or smooth, or lobulated. The liver-cells may become atrophied or fatty. The small veins and bile-ducts are often obliterated. The larger bile-ducts may be the seat of catarrhal inflammation. The liver may remain of its normal size, or it may become small, or large.

The obstruction to the passage of the blood from the portal vein through the liver causes the spleen to become large and hard, the mucous membrane of the stomach and small intestine to be congested and coated with mucus, the peritoneal cavity to contain serum.

Causes.—The disease belongs to adult life and is usually caused by alcohol, or syphilis. It is, however, occasionally seen in children and may occur without discoverable cause.

The Symptoms depend on:

1. The disturbance in the bile-producing function of

the liver, with the consequent digestive disturbances and loss of nutrition.

2. Upon the interference with the passage of the portal blood through the liver, with the consequent dropsy and inflammation of the stomach and intestines.

Physical Signs.—These depend on the changes in the size of the liver and the spleen, and the presence of fluid in the abdominal cavity.

Complications.—Persons who have cirrhosis of the liver are very apt to have at the same time pulmonary emphysema, chronic nephritis, or chronic endarteritis.

Course of the Disease.—This varies according to the early or late development of the symptoms; the predominance of the symptoms due to the disturbance of the bile-producing function of the liver and those due to the obstruction of the portal circulation; the rapid or slow progress of the disease, and the intermissions or cessation of the chronic inflammatory process.

During the early stages of cirrhosis the principal symptoms are those due to the disturbance of the bile-producing function of the liver and the accompanying chronic gastritis. It is possible for these to be the only symptoms throughout the disease.

In other cases the dropsy will be the first symptom, and the nutrition of the patient will be fairly good.

In some cases the vomiting of blood in small or large quantities will be the principal symptom.

In some cases the symptoms belonging to the accompanying chronic gastritis will be more marked than those of the cirrhosis.

In the larger number of cases all the symptoms are developed : anæmia, loss of flesh and strength, dropsy, gastric dyspepsia, and constipation.

In a few cases, after the disease has lasted for some time, there is developed a very fatal form of jaundice, especially with the large cirrhotic livers.

The patients have pain over the liver, vomiting, constipation, a constantly increasing jaundice, a febrile movement, gradual emaciation, and cerebral symptoms. These cases are not to be confounded with those of acute gastro-duodenitis complicating cirrhosis.

The Prognosis of cirrhosis is unfavorable, but yet in many cases the course of the disease is slow, and in some it is arrested altogether.

Treatment.—This is most efficacious during the early stages of the disease. The use of tobacco and alcohol are to be prohibited. Constitutional syphilis, if it exists, must be treated. The patients should lead, as far as possible, an out-of-door life. The disturbance of the bile-producing function of the liver is to be treated according to the plans already given. The gastritis is to be attended to. The dropsy is to be relieved by diuretics, cathartics, diaphoretics, and tapping the peritoneal cavity. For the hæmatemesis we use nitrate of silver and ergot.

Abscess of the Liver.

Abscesses of the liver are produced by suppurative inflammation of the walls of the bile-ducts, or of the veins, extending to the liver-tissue ; by infectious emboli in cases of pyæmia, and they occur as a primary suppurative inflammation of the liver.

IDIOPATHIC OR TROPICAL ABSCESS OF THE LIVER.

Lesions.—There is a single abscess of some size, or two, three, or four abscesses of the same character. The abscesses follow one of three anatomical forms:

1. They resemble ordinary abscesses in any part of the body. There is a cavity in the liver filled with well-formed pus, the walls of this cavity are infiltrated with pus. This is the least fatal form of abscess.

2. There is a cavity in the liver with ragged, irregular, necrotic walls, and containing a thin reddish or brownish fluid, with fragments of dead liver-tissue.

3. A considerable area of liver-tissue is dead, with little cavities filled with pus scattered through it. This is the most fatal form of abscess.

The abscesses may be situated in any part of the liver. If they are situated near the surface of the liver there will be inflammation, and the formation of adhesions to the surrounding parts. If left to themselves the abscesses usually increase in size until they perforate through the diaphragm into the lung, the pleura, or the pericardium; or into the stomach, the intestines, the peritoneal cavity, or the pelvis of the right kidney; or through the anterior abdominal wall.

Causes.—In rare cases there is a history of a blow inflicted over the liver, more frequently there is no exciting cause. The disease is much more common in tropical climates than in temperate ones. It seems probable that some of the abscesses are secondary to dysentery, and that others are due to the same pathogenic bacteria which produce dysentery, although no dysentery exists.

Symptoms.—1. As it is observed in tropical countries. The invasion is, or is not, preceded by the symptoms of dysentery. It is acute, ushered in by chills and a febrile movement, and marked prostration.

The chills may be repeated throughout the disease. The fever is of the continuous, remittent, or intermittent type, and is accompanied by sweating. There are pains and tenderness over the liver.

Jaundice is not a constant or marked symptom.

Nausea and vomiting are often present.

There may be localized or general peritonitis. There may be ascites without peritonitis.

Perforation of the abscesses is followed by symptoms according to its position.

2. As it is observed in New York. The invasion is gradual. The patients feel chilly and feverish, lose their appetites, may have nausea and vomiting, feel sick, but often do not go to bed for several days. After they get to bed the fever continues, with chills and sweating. The nausea and vomiting continue, they lose flesh and strength, there are pains and tenderness over the liver. If perforation does not take place these symptoms continue for weeks, months, or years.

Physical Signs.—At first there is a general enlargement of the liver, later a localized enlargement, according to the presence of the abscess. This may project downward into the peritoneal cavity, or upward into the pleura.

Diagnosis.—As the disease is seen in New York, it resembles, except for its local symptoms, typhoid fever.

Treatment.—During the early stages of the inflammation we may try to control it by the local application of leeches, followed by poultices, or by continuous cold; and by the internal administration of ipecac, or the chloride of ammonium, in large doses.

After the abscess is fully formed, its contents must be evacuated by the aspirator or by a free incision, according to its position.

THE FATTY LIVER.

Lesions.—There is a deposit of fat in the liver-cells, and the liver is increased in size. There are no changes in the stroma or blood-vessels. The larger bile-ducts may become the seat of acute or chronic catarrhal inflammation.

Causes.—The disease occurs at all ages; it is more common in females than in males. Intemperance, overeating, indolence, and phthisis seem to act as causes.

Symptoms.—1. Many fatty livers give no symptoms at all.

2. With some fatty livers there are marked symptoms of derangement of the bile-producing functions of the liver, with the physical signs of a large liver. The patients are fat, but anæmic and feeble. Mental lassitude and depression, and abnormal sensations in different parts of the body are prominent symptoms. The bowels are constipated, and the functions of the stomach are deranged. There is often added a chronic gastritis, sometimes with the vomiting of blood.

The Treatment of these cases is the same as that of the derangement of the bile-producing function of the liver.

3. The changes in the liver-cells may be exceptionally extensive, and the increase in the size of the liver enormous. In these patients the first symptoms are those of the disturbance of the bile-producing function of the liver, and of chronic gastritis. These symptoms do not improve, but get worse. The patients become so feeble and anæmic that they are confined to bed. They become slightly jaundiced. They finally die in a condition of extreme exhaustion.

4. Patients with fatty livers and chronic gastritis are particularly liable to attacks of acute gastro-duodenitis with jaundice. These attacks are always severe and often fatal.

5. Patients with fatty livers are liable to the same curious and fatal form of jaundice which occurs with cirrhosis. There is a constantly increasing jaundice with its attendant symptoms and death. No obstruction is found in the bile-ducts.

THROMBOSIS OF THE PORTAL VEIN.

Lesions.—The main trunk of the portal vein, or one or more of its branches, is partly or completely filled by a thrombus. This thrombus does not soften, but is replaced by new connective tissue.

Causes.—Cirrhosis or cancer of the liver, chronic peritonitis, tumors of the abdominal cavity, and injuries inflicted over the upper part of the abdomen act as causes. There are also cases which occur without discoverable cause.

Symptoms.—First there may be the symptoms of the cirrhosis, the cancer, the chronic peritonitis, the tumors, or the injuries, if these exist.

The symptoms of the thrombosis are developed rapidly.

There is rapid and persistent dropsy of the peritoneal cavity. The spleen is enlarged. There are vomiting of food and of blood, diarrhœa, and bleeding from the intestine. The urine is scanty.

In some of the patients the symptoms continue uninterruptedly up to the time of the patient's death. In others the symptoms, after a time, subside, and the patients recover. In still others the symptoms subside for a time, but recur a number of times.

SUPPURATIVE INFLAMMATION OF THE PORTAL VEIN.

Lesions.—The wall of the vein is thickened and infiltrated with pus. Its cavity is filled with soft, broken, or puriform thrombi. The inflammation and thrombosis extend from the trunk of the portal vein to its branches in the liver. The liver-tissue surrounding the inflamed vein also becomes the seat of suppurative inflammation. Portions of the thrombi may pass into the general circulation and lodge as infectious emboli in different parts of the body.

Causes.—Fish-bones and pieces of wire have been found imbedded in the wall of the vein. Inflammation of the umbilical vein in infants may extend to the portal vein. Abscesses in the abdominal cavity may be followed by inflammation and thrombosis, first of one of the branches of the portal vein and then of the vein itself. Calculi in the common bile-duct, which cause inflammation and ulceration of the wall of the duct, may also cause inflammation of the portal vein. There are cases in which suppurative portal phlebitis occurs without discoverable cause.

Symptoms.—The invasion of the symptoms may be sudden, or preceded by a few days of moderate fever, loss of appetite, and general malaise. Pain and tenderness over the liver are constant symptoms. They occur early in the disease and continue throughout its course.

The liver and the spleen are increased in size. Jaundice is often present. There are nausea, vomiting of food and of blood, diarrhœa and passage of blood from the bowels.

Chills mark the onset of the disease, and are repeated throughout its course. The temperature rises at once and continues through the disease like the temperature of pyæmia, sometimes high, sometimes low, sometimes below the normal.

There may be ascites, or local or general peritonitis.

The patients rapidly lose flesh and strength, develop cerebral symptoms, and pass into the pyæmic condition. The symptoms are evidently local—dependent on the inflammation of the vein and of the liver; and general—dependent on the septic poisoning.

The disease regularly terminates fatally at the end of about fourteen days; but it may last only a few days, or continue five or six weeks.

CANCER OF THE LIVER.

Lesions.—The new-growth takes the form of nodules, or of a diffuse infiltration of the liver. It may compress the bile-ducts, it may compress, or grow into the veins. The liver is usually increased in size, smooth or nodular, according to the form of the growth. There may be added localized or general peritonitis, or ascites.

Causes.—Cancer of the liver is usually secondary to similar new-growths in other parts of the body, especially in the stomach. The primary new-growths in the liver are malignant, but their exact nature is not yet definitely made out.

Symptoms.—It is convenient to make a clinical group of cases including primary cancer of the liver, and cancer of the stomach and liver without marked stomach symptoms.

In this group of cases local and general symptoms are developed.

The general symptoms are those common to malignant growths in any part of the body.

The local symptoms are :

Changes in the size and shape of the liver.

Ascites from the compression or thrombosis of the veins.

The evidences of chronic local or general peritonitis.

Jaundice, due to catarrhal inflammation of the bile-ducts.

The Course of the Disease.—1. The patients first complain of derangements of digestion, of gastric dyspepsia, and of functional disturbances of the liver. It often happens that these symptoms follow symptoms of the same kind, which existed before the formation of the new-growth in the liver, so that a history of similar symptoms may be given which extends over many years. This means that the patient first suffered from chronic gastritis and functional derangement of the liver, and then, at some recent time, a new-growth in the liver was formed and made the old symptoms worse without changing their character. As the tumor of the liver increases in size the patients grow worse. They lose flesh and strength, become anæmic, have an irregular fever, become a little jaundiced, have ascites, a little œdema of the legs and a large liver. The progress of the disease is at first slow and gradual, toward the end much more rapid.

2. The patients suffer from the symptoms of chronic gastritis and functional derangement of the liver. They slowly lose flesh and strength, and become anæmic. It becomes more and more evident that they have a malignant new-growth in some part of the body, but it is impossible to locate it on account of the want of local symptoms or physical signs. So these patients often die without a diagnosis having been made.

3. There are rare cases, with a large nodular liver, which behave like cirrhosis, rather than like cancer.

4. There are cases in which the new-growth very soon invades the branches of the portal vein, so that ascites is an early and prominent symptom before there has been much change in the general health. The ascites may be accompanied by chronic peritonitis. The

cases look more like chronic or tubercular peritonitis, or cancer of the peritoneum, than they do like cancer of the liver.

CANCER OF THE COMMON BILE-DUCT.

Lesions.—The growth begins in the wall of the common bile-duct near the duodenum and surrounds and constricts the duct. The growths may remain small, or may extend to the pancreas and lymphatic glands and form larger tumors. The growth constricts the bile-duct, prevents the escape of the bile, and so produces dilatation of the bile-duct and of the gall-bladder.

The disease belongs to persons over forty years of age.

Symptoms.—Jaundice is developed suddenly and increases in intensity through the disease.

Pain comes on suddenly and is referred to the region of the common bile-duct.

Nausea and vomiting often mark the onset of the symptoms and may continue.

The sudden development of the symptom in a disease of this character is a noticeable feature.

The patients go on with the symptoms of a very bad obstructive jaundice. The pigmentation of the skin becomes constantly deeper, the urine is loaded with bile-pigment, the fæces are white. The patients lose flesh and strength, there are hæmorrhages in the skin and from the mucous membranes, cerebral symptoms are developed, the tongue is brown and dry, the gall-bladder may be dilated so as to form a tumor of some size. The patients finally die deeply jaundiced, emaciated, and semi-comatose.

The duration of the symptoms is usually for from one to three months.

BILIARY CALCULI.

The solid portions of the bile may become separated from the fluid portions and form semi-solid, or solid masses within the biliary passages.

1. Inspissated bile occurs in the form of soft, brown or greenish masses composed principally of bile-pigment, with a little cholesterin, the salts of iron, soda, and potash, and sometimes thick, tenacious mucus. While in the biliary passages it retains its viscid consistence, but when dry changes into a fine powder.

2. Biliary calculi are solid bodies composed principally of cholesterin with more or less bile-pigment. They vary as to their size, shape, color, consistence, and number.

Causes.—The normal reaction of the bile is neutral or slightly alkaline, if it becomes acid cholesterin is precipitated.

There may be such a large production of cholesterin that it cannot remain in solution.

Any conditions which retard the flow of bile into the intestine, or which render the walls of the bile-passages unhealthy, are liable to produce calculi.

Calculi are rare in children, but of frequent occurrence in persons over twenty years of age. They are more common in women than in men. A sedentary mode of life, constipation, excessive eating of fats, starches, and sugars, and chronic malarial poisoning seem to have some effect in causing the formation of calculi.

I. CALCULI WHICH ARE FORMED IN THE GALL-BLADDER AND REMAIN THERE.

1. When calculi are formed in the gall-bladder they may remain there quietly and give absolutely no symptoms. The gall-bladder then usually is contracted and nearly empty of bile and the cystic duct is obliterated.

2. Calculi remaining in the gall-bladder may from time to time cause attacks of pain which last for hours or days.

These attacks of pain may be relieved by emetics, or by morphine.

3. Calculi remaining in the gall-bladder may act as irritating bodies and excite a catarrhal or suppurative inflammation of the wall of the gall-bladder.

A catarrhal inflammation is attended with dilatation of the gall-bladder and pain.

A suppurative inflammation is attended with pain, dilatation of the gall-bladder, fever, sweating, loss of flesh and strength. There may be added localized peritonitis with the formation of adhesions.

If the patients' general condition remains good, they may be kept in bed with the application of continuous cold over the gall-bladder. If the cases are at all threatening the only satisfactory treatment is to open the gall-bladder and remove the calculi.

II. CALCULI MAY PASS INTO THE CYSTIC DUCT AND BECOME IMPACTED THERE.

1. There will be an attack of biliary colic, or there are several such attacks. After the last attack has been finished for some time there will be found a tumor formed by the dilated gall-bladder. This tumor may cause so little inconvenience that it may be left alone, or it may give so much discomfort that it will be proper to empty it by the aspirator.

2. There will be an attack of biliary colic and after this first dilatation and then inflammation of the gall-bladder. The gall-bladder forms a tumor of large size, fever, sweating, loss of flesh and strength are developed; localized peritonitis may be added. If not treated these symptoms will continue and cause the death of the patient.

Some of these cases may be cured by the continuous application of cold; others by aspiration; while in others it is necessary to open the gall bladder.

3. Such a calculus may be followed by adhesions between the wall of the bile-duct and the intestine, ulceration, the escape of the calculus into the intestine, and the recovery of the patient.

III. CALCULI MAY PASS FROM THE GALL-BLADDER THROUGH THE DUCTS INTO THE INTESTINE.

Such a passage of a calculus is attended with symptoms which are called an attack of biliary colic.

The cases vary as to the size and consistence of the calculi, as to whether they are true calculi or masses of inspissated bile, as to the rapidity of the passage of the calculi, and as to the frequency of the attacks.

Symptoms.—Sometimes there is an initial chill, more or less marked; but this is not constant. Then comes the most marked symptom—pain. This usually comes on suddenly and severely, referred to the epigastrium and the lower edge of the liver, and radiating in different directions. Occasionally the invasion is slower, and the pain more dull and aching. The pain, as such, resembles that of intestinal colic, and that of nephritic colic.

Nausea and vomiting frequently accompany the attack.

Fever occurs in three ways: It may simply accompany the attack. It may be due to a complicating, localized peritonitis. It may be due to pre-existing malarial poisoning.

During an attack of biliary colic the pulse is usually small and feeble; the bowels are constipated before and during the attack; the intestines are distended with gas.

Usually the general condition of the patient remains good, but there may be marked prostration and even collapse and death.

Jaundice is regularly developed within twenty-four hours after the commencement of the pain, and continues for some days after this has subsided. But when the calculi are small, or inspissated bile is passed, the jaundice may be entirely absent.

The liver may be swollen and tender during and after the paroxysm. The gall-bladder may be swollen, tender, and sometimes surrounded by a localized peritonitis.

Duration.—With hard calculi the attacks are regularly of short duration and separated by long intervals.

With soft calculi and inspissated bile the attacks may be longer and more frequent, so that the patient will be sick for weeks or months. The jaundice and vomiting continue, there is an irregular febrile movement, and the patients lose flesh and strength.

Diagnosis.—If jaundice is present, and if the attacks are of short duration and at long intervals, the diagnosis is easy. But if there is no jaundice, or if the attacks are frequent and of long duration, the diagnosis is much more difficult. It then becomes necessary to examine the fæces for the calculi. The fæces must be mixed with water and passed through a sieve.

Treatment.—1. Of the paroxysm. To relieve the pain we give hypodermic injections of morphine and inhalations of ether or chloroform. To hasten the passage of the calculi we put the patient in a warm bath and give purgatives.

2. To prevent the formation of more calculi we regulate the mode of life, exercise, and diet, and give alkalies.

3. To promote the rapid passage of calculi already existing in the gall-bladder. For this purpose we give drugs which will produce an increased quantity of thin bile—chloroform; ether; turpentine; sulphate, cholate, phosphate, or salicylate of soda, and the alkaline mineral waters. As an empirical remedy large doses of olive-oil are sometimes of service.

IV. CALCULI MAY PASS FROM THE GALL-BLADDER INTO THE COMMON DUCT AND BECOME IMPACTED.

The patients give the history of one or more ordinary attacks of biliary colic. Then there comes an attack of biliary colic which lasts for a time and then the pain disappears or becomes less, but the jaundice continues and increases. The patients lose flesh and strength; there are loss of appetite, nausea and vomiting; the bowels are constipated, with clay-colored fæces; the tongue is brown and dry; cerebral symptoms are developed, and there are bleedings from the mucous membranes and into the skin.

If the bile-ducts within the liver become inflamed there is fever, the liver becomes large and tender, and the patients get worse much more rapidly.

This condition usually proves fatal, but it is possible for the calculus to escape by a perforation into the intestine and for the patient then to recover.

The only treatment is a surgical operation to remove the calculus.

V. CALCULI MAY PASS FROM THE GALL-BLADDER INTO THE COMMON DUCT AND REMAIN THERE WITHOUT BEING IMPACTED.

Such a calculus passes into the common duct and remains there. Then for years the calculus slowly increases in size, and the common and hepatic duct become dilated to make room for it.

The patients have repeated attacks of biliary colic, or of pains, without jaundice. After a time the patients lose flesh and strength, with symptoms of derangement of the functions of the liver and stomach. They become gradually worse from year to year, and finally die emaciated and exhausted, or with suppurative inflammation of the gall-bladder, or of the bile-ducts within the liver.

The Treatment is to remove the calculus by a surgical operation.

VI. CALCULI IN THE INTESTINE.

A calculus of some size, situated in the gall-bladder, may cause inflammation of the wall of the gall-bladder, adhesions to the intestine, perforation, and escape of the calculus into the intestine.

These morbid processes are naturally attended with symptoms, but it sometimes happens that the patient will give no history of them.

After a time the calculus is increased in size by the deposition about it of successive layers of mucus, and of the salts of lime.

Such a calculus may remain in the intestine for a long time without any symptoms, except occasional uncomfortable feelings in the abdomen. It may produce attacks of severe pain. It may cause partial or complete obstruction of the intestine.

The only treatment is the removal of the calculus by a surgical operation.

THE KIDNEYS.

THE important parts of the kidneys are the capsules, the pelvis, and calyces, the tubes, the glomeruli, the blood-vessels, and the stroma.

The capsules are connective-tissue membranes which invest the kidneys, and from which blood-vessels penetrate the kidney tissue. Their share in the lesions of the kidney is comparatively unimportant.

The pelves and calyces of the kidney are lined with a mucous membrane, which may become inflamed, and they themselves may be dilated.

The tubes form the essential part of the kidneys. Each tube begins in a glomerulus, and terminates in one of the collecting tubes of the pyramids. The tubes are lined throughout with epithelial cells. In the tubes in which the urine is formed, the epithelial cells have a well-marked network, a delicate investing membrane, and are readily changed by disease. In the tubes through which the urine is merely conducted, the epithelial cells have a less developed network, a firm investing membrane, and are much less frequently changed by disease.

The glomeruli are composed of a capsule, lined with flat cells, and formed by an expansion of the basement membrane of the tubes; and of a tuft of capillary vessels contained within the capsules. These capillaries differ from ordinary capillaries in that their walls are thicker, that they are not lined by a continuous layer of endothelium, and that their outer surfaces are completely covered by a layer of flat cells.

The arteries very often are changed by disease. Either there is thickening of one or of all of their coats, or they are the seat of waxy degeneration.

The stroma is often infiltrated with cells, or irregularly thickened by a new-growth of connective tissue.

THE NORMAL FUNCTIONS OF THE KIDNEYS.

These are to remove from the body excrementitious substances and water.

The excrementitious substances are numerous, but the most important are urea, uric acid, and the urates of sodium and ammonium.

The filtration of water is effected by the glomeruli, the excretion of solids by the renal epithelium.

DISTURBANCES OF THE FUNCTIONS OF THE KIDNEYS.

These are effected by:

1. Rapid or slow changes in the tissues of the kidneys.

2. Changes in the quantity, the composition, and the rapidity of circulation of the blood.

3. Nervous influences affecting the quantity of the urine.

4. Diseases of the urethra, bladder, ureters, and pelves of the kidneys.

5. Diseases of the lungs, heart, liver, stomach, and intestines.

BRIGHT'S DISEASE OF THE KIDNEYS.

The group of diseases of the kidney included under this name is subdivided as follows:

I. Acute Bright's Disease:
1. Acute congestion of the kidney.
2. Acute degeneration of the kidney.
3. Acute exudative nephritis.
4. Acute diffuse nephritis.

II. Chronic Bright's Disease:
1. Chronic congestion of the kidney.
2. Chronic degeneration of the kidney.
3. Chronic diffuse nephritis with exudation.
4. Chronic diffuse nephritis without exudation.

To all these varieties of Bright's disease there belongs a definite set of symptoms, but each variety of the disease varies as to the number of the symptoms present, their severity, and the predominance of one or more of them. It is convenient, therefore, first to describe these symptoms, and then, with the description of each of the varieties, to indicate which of these symptoms belong to it.

The Urine.—The urine is diminished in quantity by acute or chronic congestion, and by acute inflammation of the kidney. In chronic nephritis the urine is sometimes diminished, sometimes increased. Scanty, or suppressed, urine may continue for several days without symptoms. After a time, however, prostration, mild delirium, stupor, the typhoid state, and death follow.

The urine is increased in quantity in chronic nephritis with a slow growth of interstitial connective tissue, or with waxy degeneration of the blood-vessels.

The normal specific gravity of the urine is about 1.025. This indicates the normal proportion of the solid and fluid constituents of the urine. It is sufficient in some cases only to determine the specific gravity; in other cases we must also ascertain the quantity of urea excreted, which should be about ten grains to the ounce of urine. In acute and chronic congestion of the kidney, in acute and chronic degeneration, and in acute nephritis, there are no marked changes of the specific gravity. But in chronic nephritis it is regularly lowered.

The urine may contain blood. This occurs most frequently with acute nephritis, and with exacerbations of chronic nephritis. Occasionally there is profuse bleeding from the atrophied kidneys of chronic nephritis.

The urine may contain albumin. Serum albumin and serum globulin are normal constituents of the serum of the blood. Their presence in the urine is most readily determined by the heat and nitric acid test. Their presence in the urine means that the serum of the blood has exuded from the blood-vessels into the kidney tubules.

Such an exudation of the blood-serum in the kidneys, as in other parts of the body, regularly accompanies inflammation, changes in the composition of the blood, and venous congestion. It is probable that there are also changes in the walls of the blood-vessels.

Peptone and propeptone are the products of gastric and pancreatic digestion of albuminous substances, and are also produced in the processes of transformation of tissues, and of inflammatory effusions.

They are found in the urine, with or without serum albumin. Their presence in the urine denotes the existence of disturbances of digestion.

Peptone is precipitated by metaphosphoric acid, acidulated brine, picric acid, potassio-mercuric chloride. The precipitate is dissolved by heat.

Propeptone is precipitated by nitric acid, metaphosphoric acid, acidulated brine, picric acid, potassio-mercuric chloride, potassium ferro-cyanide. The precipitate is dissolved by heat.

PHYSIOLOGICAL ALBUMINURIA.

Although albumin in the urine regularly belongs to Bright's disease, yet it is also met with in persons who have no disease of the kidneys. We find it in the following groups of cases :

1. *Paroxysmal, or Cyclic, Albuminuria.*—This occurs most frequently in young males who are anæmic, poorly nourished, have headaches, neuralgic pains, bodily and mental languor, hysteria, disturbances of the functions of the stomach, liver, and intestines. The albumin is absent at night and present at certain fixed hours every day. It is increased by the erect posture, by food, and by mental or bodily exertion. It disappears while the patient remains in bed. The quantity of albumin is not large, and there are few or no casts.

The patients regularly recover under treatment directed to their general health.

2. *Dietetic Albuminuria.*—This occurs at all ages. It may follow the ingestion of certain kinds of food—cheese, pastry, and eggs ; or any food ; or any food which

is not properly digested ; or food followed by exercise. The quantity of albumin is small, and there are no casts.

The condition is not a serious one, and treatment is to be directed to the digestive system.

3. *Albuminuria after Exertion.*—The exertion must be severe and prolonged. The quantity of albumin may be considerable, and there are also casts. These cases must be closely studied to be sure that no disease of the kidneys is present. If there is not, they do well and require no treatment.

4. *Simple Persistent Albuminuria.*—These patients may for years have small quantities of albumin in their urine nearly every day without any other symptoms. These cases are always suspicious, and it is only by careful and long-continued observation that we can convince ourselves that no disease of the kidney exists.

Casts are cylindrical bodies formed in the kidney tubules by the coagulation of substances contained in the blood-serum. They are composed of a transparent, homogeneous matter, with which may be mixed renal epithelium, pus-cells, red blood-cells, and the granular matter, fat, and nuclei derived from degenerated renal epithelium. So we find hyaline, epithelial, pus, blood, nucleated, granular, and fatty casts. These casts, after being formed, may remain in the kidney tubules, or may come away with the urine. The number of them which we find in the urine is usually, but not always, an indication of the number formed in the kidneys.

Irregular masses of coagulated matter are also formed in the kidney tubules, portions of which may come away with the urine.

The presence of these casts or masses of coagulated matter in the urine is an indication that an exudation is going on from the blood-vessels of the kidney.

As a rule, if there is much albumin in the urine there are also many casts. But we may find albumin without casts, and casts without albumin.

Dropsy of the serous cavities and of the subcutaneous connective tissue is a frequent symptom of Bright's disease. It seems to be due to changes in the composition and quantity of the blood, and to disturbances of the circulation. Probably there are also changes in the walls of the blood-vessels.

Stomach Symptoms are often present. There may be vomiting with acute nephritis as with any other acute inflammation. There may be an exudation of serum, or an excretion of urea from the mucous membrane of the stomach with vomiting. Very often there is a complicating catarrhal gastritis with its symptoms. Uræmic attacks are often accompanied by vomiting.

The Intestines also give symptoms. There may be a simple diarrhœa ; a diarrhœa with a large exudation of serum ; an excretion of urea from the intestinal mucous membrane ; or a chronic colitis with the production of mucus and pus.

The Lungs may give the symptoms of dyspnœa. This dyspnœa may be due to compression of the lungs by fluid in the pleural cavities ; to infiltration of the lungs with serum ; or it may be a spasmodic dyspnœa caused by contraction of the small arteries throughout the body.

The Eyes.—There may be sudden, but temporary, blindness without any lesion of the eyes. There may be ordinary neuro-retinitis. There may be nephritic retinitis, with degeneration of portions of the retina and hemorrhages. With valvular lesions of the heart and chronic Bright's disease there may be hemorrhages into the retina without retinitis.

Neuralgic Pains following the course of the nerves of the head and face are a marked symptom in some patients.

The Blood is regularly changed. There may be a diminution in the quantity of hæmoglobin and the numbers of red blood-cells. The quantity of blood may be increased in hydræmic plethora. The quantity of urea contained in the blood may be increased or diminished.

Uræmic Symptoms.—This name has been given to a set of symptoms belonging to Bright's disease, which it was formerly believed were the direct result of the accumulation of urea in the blood. We no longer believe that this is the only cause of such symptoms, but the name is still retained.

1. *Chronic Uræmia.*—The mind is dull and apathetic, there may be mild delirium, stupor, or coma. General convulsions and muscular twitchings are rare. The body becomes feeble and emaciated, the temperature is low, the patients pass into the typhoid state, and finally die. Such a condition may last for days, weeks, or months. It occurs regularly with scanty or suppressed urine, and with a long-continued scanty excretion of urea. There may be an increased quantity of urea in the blood. The arterial tension is not increased.

2. *Acute Uræmic Attacks.*—The symptoms come on

in attacks which last for hours or days, may disappear, or may cause the death of the patient. The following symptoms belong to an attack, but the attacks vary as to the number and severity of the symptoms: Headache, sleeplessness, delirium, stupor, muscular twitchings, general convulsions, coma, hemiplegia, blindness, dyspnœa, vomiting, and a rise of temperature. Such attacks are regularly, but not always, accompanied by increased arterial tension. The association is so frequent that it seems probable that the attacks are caused by contraction of the arteries. This belief is rendered still more probable by the fact that the symptoms usually disappear when the contraction of the arteries is stopped.

ACUTE BRIGHT'S DISEASE.

1. Acute Congestion of the Kidney.
2. Acute Degeneration of the Kidney.
3. Acute Exudative Nephritis.
4. Acute Diffuse Nephritis.

1. *Acute Congestion of the Kidney.*—This condition is produced by the ingestion of poisons, by extirpation of one kidney, by injuries, by surgical operations, and by other somewhat uncertain causes.

It may occur in kidneys previously normal and in those already diseased.

The most marked symptom is the diminution or suppression of the urine, but there may also be albumin and casts in the urine.

This interference with the functions of the kidneys adds to the dangers of injuries and of operations, and may of itself prove fatal.

2. *Acute Degeneration of the Kidney.*—This is also called parenchymatous inflammation, or degeneration.

Lesions.—The essential part of the lesion is a degeneration or death of the renal epithelium, especially that of the convoluted tubes.

The epithelial cells are swollen and opaque; or the cell bodies contain fat; or the cells die and either disintegrate, or pass into the condition of coagulation necrosis. The dead cells desquamate, and may be replaced by a growth of new cells.

In the more severe cases there is added an exudation of serum from the blood-vessels.

In the milder cases the gross appearance of the kidneys hardly differs from the normal. In the more severe cases the kidney is enlarged, the cortex thick and pale. In the most severe cases the kidney is congested.

Causes.—This lesion of the kidneys is always secondary to the introduction of a poison into the body. The poison is inorganic, such as phosphorus, arsenic, or mercury; or bacteritic, belonging to the infectious diseases.

Symptoms.—The urine is diminished in quantity, or suppressed. The specific gravity is unchanged. No albumin or casts are present, unless there is added an exudation from the blood-vessels.

The kidney lesion seems to give no symptoms of its own, but only to add to the dangers of the primary poison.

3. *Acute Exudative Nephritis.*—Synonyms: Parenchymatous nephritis, tubal nephritis, desquamative nephritis, catarrhal nephritis, croupous nephritis, glomerulo nephritis.

Of this form of nephritis we distinguish :

1. A mild form.
2. A severe form.
3. A form with an excessive emigration of white blood-cells.
4. A protracted form.

Lesions.—In the mild cases the inflammation is attended with exudation, without any structural changes in the kidneys.

In the more severe cases, the kidneys are large, smooth, the cortex is thick, white, or white mottled with red, or the entire kidney is congested.

If the stroma is infiltrated with serum, the kidney is œdematous.

If there is an excessive emigration of white blood-cells, these are found in the tubes, the stroma, or the capillary veins, and are collected so as to form little foci.

Of the serum exuded from the vessels a part is coagulated in the tubes in the form of cast matter and of irregular coagulated matter ; a part is mixed with the urine.

The renal epithelium is flattened, or swollen and opaque, or infiltrated with fat, or degenerated and broken, or necrotic and detached.

There may be a general, symmetrical dilatation of the cortex tubes.

The stroma may be infiltrated with serum, or with pus.

In the glomeruli there may be coagulated matter between the capsules and the tufts. The capsule-cells are swollen. The cells which cover the outside of the capillaries are increased in size and number. The cells which line the inside of the capillaries are swollen.

In the arteries there may be a swelling of the muscular coat.

In the protracted cases there is a diffuse growth of connective tissue between the tubules.

Causes.—The disease is especially common in young children. It occurs as a primary inflammation, and is secondary to scarlatina, measles, diphtheria, typhoid fever, acute general tuberculosis, pneumonia, endocarditis, peritonitis, dysentery, erysipelas, diabetes, and pregnancy.

It occurs in local epidemics, apparently of bacteritic origin.

Symptoms.—In the mild cases the only pronounced symptom is the change in the urine. The patients are not confined to bed and, although they do not feel perfectly well, they have no definite symptoms.

The urine is somewhat diminished in quantity, its specific gravity is not changed. It contains albumin, casts, and blood.

In the well-marked cases, the urine is diminished in quantity or suppressed. The specific gravity is unchanged. It contains albumin, casts, white and red blood-cells, granular matter, and renal epithelium. The quantity of albumin and the number of casts are regularly, but not always, in proportion to the severity of the nephritis.

There are also constitutional symptoms : a febrile movement, prostration, loss of appetite, nausea, vomiting, anæmia, dropsy.

To these may be added : headache, restlessness, sleeplessness, delirium, stupor, convulsions, coma. The heart's action may be exaggerated and tumultuous, or feeble and irregular. The left ventricle of the heart may be enlarged. There may be contraction of the arteries with increase of arterial tension.

In the bad cases the cerebral symptoms—the delirium, stupor, and convulsions—are exaggerated; or, with a prolonged scanty excretion of urine, the patients pass into the condition of chronic uræmia.

In the cases of acute exudative nephritis with an excessive formation of pus, the clinical history is somewhat different.

Such cases occur both in childhood and in adult life. The nephritis may be primary, or follow scarlatina, diphtheria, or measles.

The invasion of the disease is sudden. There are marked fever and prostration, restlessness, sleeplessness, delirium, headache, stupor. The patients lose flesh and strength, and pass into the typhoid state. Dropsy is absent altogether, or very slight. The entire clinical picture resembles that of acute meningitis.

The urine is not much diminished in quantity; its specific gravity is unchanged; albumin, casts, and blood may be present, but sometimes not until late in the disease, and sometimes they are entirely absent.

Prognosis.—In the larger number of cases the patients recover entirely from their nephritis. But the very intense forms of nephritis, and especially those with an excessive production of pus, are apt to prove fatal. In a few cases the acute symptoms subside, but the patients go on to have chronic Bright's disease.

4. *Acute Diffuse Nephritis.*—This is the most important af all the forms of acute Bright's disease, for the reason that the changes in the kidney are extensive and permanent, and that disturbances of the circulation are usually associated with it.

Causes.—It occurs as a primary nephritis, and complicates scarlatina, diphtheria, and pregnancy.

Lesions.—The kidneys are large; the cortex is thick, white, mottled red and yellow, or congested; the surface is smooth.

The same changes are found as have been already described as belonging to exudative nephritis, and in addition:

1. A growth of new connective tissue in the stroma.

2. A growth of the capsule-cells of the glomeruli so extensive as to compress the tufts of vessels. Both of these lesions are permanent ones. The essential difference between exudative and diffuse nephritis is, that in exudative nephritis all the lesions are transitory and disappear after the subsidence of the inflammation, while in diffuse nephritis the growth in the stroma and of the capsule-cells is permanent, so that the kidneys can never return to their normal condition.

Symptoms.—The urine is at first scanty, colored by blood, of unchanged specific gravity, contains albumin, casts, and blood. Exceptionally, the casts are absent.

Later, or with the subacute form of the nephritis, the specific gravity becomes lower, while the albumin and casts continue to be present.

In the cases which fairly become chronic, the albumin and casts may for a time disappear.

In the more acute cases there is, for a time, a febrile movement. In all the cases there are loss of flesh and strength, loss of appetite, nausea and vomiting, and anæmia. Dropsy is a very constant symptom.

In many of the cases there are present: headache, restlessness, sleeplessness, delirium, stupor, coma, muscular twitchings, general convulsions, neuro-retinitis, nephritic retinitis, neuralgic pains, cough and dyspnœa, vomiting, diarrhœa, increased arterial tension, and hypertrophy of the left ventricle of the heart.

Course of the Disease.—The invasion of the disease may be sudden, the symptoms marked, and its termination fatal within a short time.

Or, the invasion may be sudden, then the acute symptoms subside and the nephritis goes on in a subacute or chronic form for months or years. In these prolonged cases there are often many intermissions and exacerbations of the symptoms.

Or, the invasion may be subacute, the development of the symptoms slow and gradual, and the disease prolonged for months or years.

The Prognosis of acute diffuse nephritis is apt to be bad on account of the disposition of the inflammation to continue. But there is much variety as to the length of the disease and the severity of the symptoms, and recovery seems to be possible.

Treatment.—1. *Of Acute Congestion of the Kidney.*—The indications are to diminish the congestion of the kidneys by wet or dry cups, or heat over the lumbar region; or by heat applied to the entire surface of the body.

2. *Of Acute Degeneration of the Kidney.*—We have no means by which we can influence acute degenerative changes in the renal epithelium. Treatment is confined to the primary disease, which causes the changes in the kidney.

3. *Of Acute Exudative Nephritis, and of the Acute Stage of Acute Diffuse Nephritis.*—The patients are to be kept in bed, on a fluid diet, and the bowels should be moved every day.

To diminish the severity of the nephritis, we employ cups over the lumbar region, heat over the lumbar region or over the entire surface of the body; calomel or sulphate of magnesia in small and repeated doses, and opium or aconite in small and repeated doses.

To treat the cerebral symptoms, we must notice the condition of the heart and arteries.

With a laboring heart and contracted arteries, we employ the drugs which dilate the arteries: chloral hydrate, opium, nitrite of amyl, and nitro-glycerine; or we diminish the quantity of blood by venesection, sweating, or purging.

With a feeble heart and relaxed arteries, we use digitalis, caffein, convallaria, or strophanthus.

With no change in the heart or arteries, it is difficult to tell what to do, but we usually purge or sweat the patients.

The dropsy usually requires no treatment.

The convalescence of these patients should be carefully watched for months, that the disease may not become chronic.

4. *Of the Subacute and Protracted Forms of Acute Diffuse Nephritis.*—It may be necessary for a time to keep the patients in bed, but as soon as possible they should be out-of-doors in a warm climate.

The patients are to be kept on a fluid diet, but not for too long a time, or too exclusively.

For the nephritis, residence in a warm, dry, inland climate, with an out-of-door life, seems to be the most efficient treatment. It is possible that the continued use of small doses of opium, or of the bichloride of mercury, may also be of service.

To improve the anæmia we use iron and oxygen.

To diminish the dropsy we regulate the diet so that the quantity of fluids ingested is less than that of the urine excreted; we try to improve the anæmia; we regulate the action of the heart and the condition of the arteries; we puncture the skin and tap the serous cavities; we use diuretics, cathartics, diaphoretics, and massage.

THE ACUTE BRIGHT'S DISEASE OF PREGNANCY.

It is convenient to make a clinical group of the patients who develop acute renal symptoms in the course of pregnancy.

Such symptoms are more frequent in primiparæ, in young women, and in women who are carrying twins. Similar attacks may be repeated in successive pregnancies.

The symptoms never appear before the third month of pregnancy, and usually not until the later months. The symptoms increase in severity as the pregnancy advances, and are most marked at the time of labor, *Lesions.*—Although the symptoms are essentially the same in all these cases, the kidneys differ.

In some cases there are no structural changes in the kidneys.

In some cases there is an acute exudative nephritis; in some an acute diffuse nephritis; in some acute degeneration of the kidney.

Symptoms.—The urine is diminished in quantity, its specific gravity is unchanged, it contains much albumin. But in some cases the albumin does not appear until after the other symptoms.

The patients rapidly become anæmic. They have dropsy, headache, blindness, nausea and vomiting, convulsions, coma or hemiplegia.

Some of the patients recover entirely. Some of them die with convulsions, or comatose. Some of them, after recovering from the acute attack, go on to have the symptoms of chronic nephritis.

Treatment.—The main indications for treatment are: to induce labor and deliver the child as rapidly as is practicable; to lessen the condition of hydræmic plethora by venesection or purging; to relax the arteries by chloral hydrate; and to diminish the severity of the convulsions by inhalations of chloroform.

CHRONIC BRIGHT'S DISEASE.

1. Chronic Congestion of the Kidney.
2. Chronic Degeneration of the Kidney.
3. Chronic Diffuse Nephritis with Exudation.
4. Chronic Diffuse Nephritis without Exudation.

I. Chronic Congestion of the Kidney.

Lesions.—The kidneys are of medium size, or large. Their weight is increased. They are hard, congested, with a smooth surface. The epithelium of the cortex tubes is opaque, and either flattened or swollen.

In the glomeruli the capillaries are dilated, their walls thickened, and the cells covering the capillaries are swollen. In the stroma there may be some increase in the size in the subcapsular areas of connective tissue. The arteries are unchanged. The pyramid veins are congested and may be dilated.

Causes.—This change in the kidneys is always due to some mechanical interference with the circulation of the blood. The ordinary causes are: chronic endocarditis, pericarditis, dilatation of the ventricles of the heart, aneurism of the aorta, pulmonary emphysema, fluid in the pleural cavity, and tumors.

Symptoms.—The urine is diminished at the times when the disturbance of circulation is most marked. It is never increased in quantity, except by accidental circumstances. The specific gravity is from 1.020 to 1.025, but it may for a time fall to 1.010 or rise to 1.035. The excretion of urea is usually 10 grains to the ounce. It may rise to 21 grains. Albumin and casts are absent, or only present in small quantities. The only bad results of chronic congestion are the diminished production of urine, and the liability of the kidneys to pass into the condition of chronic nephritis.

The Treatment is directed to the regulation of the action of the heart and of the contraction of the arteries.

II. Chronic Degeneration of the Kidneys.

Lesions.—The kidneys are large and weigh from 16 to 20 ounces. Their surfaces are smooth. The cortex is thick, and of white or pinkish color ; the pyramids are red. The epithelium of the cortex tubes is swollen, granular, fatty, and degenerated. In the glomeruli there may be dilatation of the capillaries and swelling of the tuft-cells. There are no changes in the stroma or arteries. The pyramid veins are congested. There may be a little exudation from the vessels with cast matter and coagulated matter in the tubes.

Causes.—This condition of the kidneys is produced by causes which disturb the circulation, such as chronic endocarditis, dilatation of the ventricles of the heart, and empyema ; and by causes which impair the nutrition of the body, such as chronic alcoholism.

Symptoms.—The quantity of the urine varies. It may be increased in quantity, diminished, or suppressed. The specific gravity and the proportion of urea to the ounce are unchanged. Albumin and casts are often present in small quantities.

The patients, in addition to the symptoms of the primary disease, lose flesh and strength and become anæmic.

There may be suppression of urine for several days, and the symptoms of chronic uræmia.

Chronic degeneration of the kidneys may be followed by chronic nephritis.

The Treatment is directed to the regulation of the circulation and the improvement of the general health.

III. Chronic Diffuse Nephritis with Exudation.

Lesions.—Most of the kidneys are large. Their surfaces are smooth, roughened, or nodular. The cortex is thick, white, gray, or mottled. Less frequently the kidneys are small, or resemble a normal kidney. There is a large exudation of serum from the blood-vessels, with casts and coagulated matter in the tubes. The epithelium of the tubes is degenerated; there is a growth of new connective tissue in the stroma; in the glomeruli there is a growth of tuft-cells and of capsule-cells, and the capillaries may be obliterated, or the seat of waxy degeneration. The walls of the arteries may be thickened, or the seat of waxy degeneration.

Causes.—Such a chronic nephritis may follow acute or subacute nephritis, or chronic degeneration of the kidneys. It may complicate syphilis, chronic phthisis, prolonged suppuration, chronic inflammation of the bones and joints. As a primary lesion, it is especially common in young adults.

Symptoms.—The urine varies much in its quantity at different times, sometimes increased, sometimes diminished. Albumin and casts are present in large quantities during most of the time. Blood may be present during the exacerbations of the nephritis. The specific gravity is low and the excretion of urea diminished.

Dropsy is a very constant symptom. It appears early in the disease, it may continue uninterruptedly, or come and go.

Anæmia, diminution in the number of red blood-cells and in the quantity of the hæmoglobin, is a marked feature throughout the disease.

Headache and sleeplessness are often present.

Simple neuro-retinitis and nephritic retinitis are not infrequent.

There may be dyspnœa from œdema of the lungs, or hydrothorax.

Nausea and vomiting are often present.

There may be chronic endocarditis, or a feeble heart action.

The patients do not often have contraction of the arteries, or acute uræmic attacks, but they may pass into the condition of chronic uræmia.

Duration.—The cases vary much in their duration. Some terminate fatally at the end of a few months, others continue for many years. In the prolonged cases the symptoms are not continuous, but interrupted by periods of improvement.

The Prognosis is bad, but yet life may be prolonged for many years; there may be long intervals of relief from symptoms, and even a permanent cessation of symptoms seems possible.

Treatment.—The most important part of the treatment is the residence of the patient in a warm, dry climate, where he can lead an out-of-door life. The regulation of the diet and the correction of any errors of digestion are also of importance. Small doses of opium, or of the bichloride of mercury, may be of service. The dropsy and the anæmia often require treatment. For this purpose we regulate the quantity of fluids ingested, use diureties, cathartics, and diaphoretics, puncture the skin, or tap the serous cavities.

The anæmia is to be treated with iron, oxygen, diet, and regulation of the mode of life.

All errors of digestion are to be watched for and remedied.

IV. Chronic Diffuse Nephritis without Exudation.

Lesions.—The kidneys are usually small, they may be of normal size, or large. The capsules are adherent; the surfaces of the kidneys are roughened, or nodular.

There is an extensive growth of new connective tissue in the stroma.

The epithelium of the tubes is degenerated. The cortex tubes are often dilated in groups, sometimes so much so as to form cysts.

Of the glomeruli the capsules are thickened, the capsule-cells and the tuft-cells are increased in size and number, the capillaries may be obliterated, or the seat of waxy degeneration. The arteries show thickening of all their coats, or obliterating endarteritis, or waxy degeneration.

Complicating lesions are often present: Chronic meningitis, cerebral apoplexy, hypertrophy or dilatation of the left ventricle of the heart, endocarditis, pericarditis, pulmonary emphysema, bronchitis, gastric catarrh, cirrhosis of the liver, and chronic endarteritis.

Symptoms.—1. *Of the More Rapid Form, with Occasional Exacerbations and Small Quantities of Albumin in the Urine.*—The urine is increased in quantity, except during the exacerbations of the nephritis and the attacks of contraction of the vessels, then it is scanty. The specific gravity is low, and the quantity of urea is diminished. Albumin and casts are absent during most of the time, but are occasionally present in small quantities.

The patients may have neuralgic pains, symptoms of gastric dyspepsia, anæmia, loss of flesh and strength, neuro-retinitis, headache, sleeplessness, muscular twitchings, spasmodic dyspnœa, vomiting, general convulsions, stupor, delirium, and coma. During the acute uræmic attacks there is often a rise of temperature. They may pass into the condition of chronic uræmia. The left ventricle of the heart is hypertrophied or dilated, or the heart's action may become feeble and irregular. There are often added the symptoms of the complicating lesions already mentioned.

Dropsy is absent or slight, unless produced by a complicating lesion.

The most prominent symptoms are: the contraction of the arteries, the acute uræmic attacks, and the loss of flesh and strength.

The disease usually lasts for many years. The patients die in an acute uræmic attack, or with chronic uræmia, or from some intercurrent disease.

The Treatment is directed to the improvement of the general health, the correction of errors of digestion, and the relief of the attacks of acute uræmia.

2. *Of the Very Slow Cases.*—The urine is increased in quantity except during attacks of acute uræmia. The specific gravity is low, the excretion of urea is diminished. Albumin is absent altogether, or very scanty. Hyaline casts in small numbers may be present.

The patients are liable to contraction of the arteries, to hypertrophy of the left ventricle, to acute uræmic attacks. They often suffer also from chronic endarteritis, pulmonary emphysema, and cirrhosis of the liver.

The course of the disease varies.

1. The patients never have any symptoms except the changes in the urine.

2. The patients have disturbances of digestion, loss of flesh and strength, increased arterial tension, headache, and sleeplessness. They may become very feeble and die.

3. After going on for years without any symptoms, there may be a sudden attack of acute uræmia.

4. There may be no symptoms until the patient has a pneumonia, or a pericarditis, or suffers from an accident, and then renal symptoms are developed.

The Treatment is directed to the improvement of the patient's general health, and the relief of arterial tension and of the uræmic attacks.

SUPPURATIVE NEPHRITIS.

Suppurative inflammation of the kidneys is caused by injuries, by infectious emboli, by cystitis, by calculi in the pelvis of the kidney, and occurs without discoverable cause.

1. *Suppurative Nephritis from Injury.*—The injury may be a gunshot, incised, or punctured wound; or a fall, blow, or kick.

If such an injury is very severe, it causes death very soon ; if it is less severe, it is followed by the inflammation of the kidney.

The inflammation may be diffuse and the greater part of one or both kidneys changed into a soft mass of pus, blood, and broken-down tissue; or the inflammation may be circumscribed, with the formation of one or more abscesses.

The commencement of the inflammation is marked by chills and a rise of temperature. The fever continues and follows the hectic type. There may be nausea and vomiting. There is more or less pain over the diseased kidney. The urine is diminished or suppressed, it contains blood and pus.

The symptoms may subside and the patient recover. Or the disease goes on actively, the patients pass into the pyæmic condition, and die. Or the suppurative process becomes chronic, the patients become emaciated and anæmic, the viscera undergo waxy degeneration.

The treatment is the usual surgical treatment of any abscess.

2. *Suppurative Nephritis from Infectious Emboli.*—Such emboli occur with malignant endocarditis, with thrombi in the veins, and with pyæmia.

The kidneys are large, congested, and studded with small abscesses and infiltrations of pus.

The patients only have the symptoms of their primary disease.

3. *Idiopathic Abscesses.*—These occur without discoverable cause. Only one kidney is involved. We find after death part of the kidney destroyed, the remaining portions contain abscesses; the pelves are dilated and contain pus, the capsules are thickened; the suppurative inflammation may extend to the surrounding tissues. It

is difficult to tell whether the inflammation begins in the kidney or in its pelvis.

The symptoms begin gradually and are obscure for some time.

There are repeated chills and an irregular febrile movement.

The patients lose flesh and strength, become anæmic, and often are troubled by nausea and vomiting.

There is more or less pain over the inflamed kidney. After a time the pelvis of the kidney may become so much dilated as to form a tumor. If the pus escapes from time to time through the ureter, this tumor will vary in size.

The urine, at intervals, should contain pus and fragments of broken-down kidney tissue.

If the suppurative inflammation extends, there will be sinuses running behind the peritoneum, or into the cavity of the peritoneum, or into the colon, or upward through the diaphragm.

The disease is apt to last a long time. The patients are liable to have chronic diffuse nephritis involving the other kidney, or waxy degeneration of the viscera.

The treatment is surgical—to open into the inflamed kidney or to remove it.

4. *Suppurative Nephritis from Cystitis.*—Both kidneys are inflamed. They are swollen, congested, and studded with foci of pus.

The bladder always shows the lesions of acute or chronic cystitis. The ureters may also be inflamed.

1. With cystitis due to stone in the bladder, strictures of the urethra, operations on the urethra and bladder, and paraplegia.

The patient has first the symptoms of the cystitis. When the kidneys become inflamed, there are repeated chills and a febrile movement, the urine is diminished and contains pus, blood, and mucus. The patients soon pass into the pyæmic condition.

2. With cystitis due to gonorrhœa. First, there is a severe specific urethritis, then a severe acute cystitis, and then the nephritis.

The patients get worse rapidly with fever, great prostration, and marked cerebral symptoms.

3. With cystitis due to enlargement of the prostate.

The patients are elderly men who have suffered for some time with the symptoms of enlarged prostate with more or less cystitis.

The patients, on some day, find that they are passing little or no urine, and some blood. They become anxious and restless, the pulse becomes rapid and feeble, the skin cold, and they pass into collapse and die in a few days. Or they develop chills and a febrile movement, and pass into the pyæmic condition.

When the nephritis is once established, no treatment seems to be of any avail, and all the patients die. Treatment is directed altogether to the cystitis, which may at any time cause the nephritis.

TUBERCULAR NEPHRITIS.

The different portions of the genito-urinary tract—the kidneys, ureters, bladder, seminal vesicles, prostate, testicle, uterus, and ovaries—may become the seat of a localized tubercular inflammation.

Such an inflammation may involve one of these organs, or several. If several are involved, they are on the same side of the body, usually the left side. The inflammation is attended with the presence of tubercle bacilli, the formation of tubercle tissue and of round-celled tissue. This new tissue soon dies and undergoes cheesy degeneration.

In the kidneys the inflammation begins in the mucous membrane of the pelves and calyces, and extends to the kidney tissue, until a large part of the organ is replaced by the degenerated new tissue. The cheesy masses may soften or become calcified, while the kidney between them is converted into fibrous tissue, more or less infiltrated with pus.

The other kidney is apt to become the seat of the exudative form of chronic diffuse nephritis.

The tubercular nephritis may be complicated by tubercular inflammation of other parts of the genito-urinary tract on the same side of the body, by tubercular peritonitis, by general tuberculosis, or by pulmonary phthisis.

The disease is said to occur at all ages; it is most frequent in middle-aged persons. It occurs twice as often in man as in woman.

Symptoms.—The urine usually, but not always, contains from time to time blood, pus, detritus, epithelium, and shreds of tissue. When the other kidney has become the seat of chronic diffuse nephritis, the urine has a lower specific gravity, and contains albumin and casts.

Pain, either continuous or in paroxysms, and tenderness, are often present over the inflamed kidney.

There may be a hectic fever with night-sweats.

The kidney may be enlarged so as to form a tumor which can be felt.

The patient gradually loses flesh and strength.

After a time are added the symptoms of tubercular inflammation of other parts of the genito-urinary tract, of tubercular peritonitis, of pulmonary phthisis, of waxy degeneration of the viscera, and of chronic Bright's disease.

The disease lasts regularly for several years. Most of the cases terminate fatally; but it is possible for the inflammation to stop and for the patients to recover.

The Treatment is the same as that of pulmonary phthisis.

TUMORS OF THE KIDNEY.

The most important new-growths of the kidney are those belonging to the classes of sarcoma and adenoma.

The sarcomata originate in the kidney, or in its pelvis. They are formed by connective tissue with an excess of cells, or there may be added mucous tissue, or fibres of striated muscle. These tumors often reach a large size, are of firm consistence, and retain somewhat the shape of the kidney. They are especially common in infants and children.

The adenomata originate in the kidney tissue. They follow the tubular, or papillary, type. Some remain of small size and are not malignant; others attain a very large size and are malignant. The large tumors are very vascular.

Symptoms.—The characteristic symptoms are: a tumor, pain, hæmaturia, and the cachectic state.

The tumor cannot be made out until it has reached a sufficient size. It may be confounded with tumors of the liver, or of the ovaries.

The pain over the tumor is not a constant symptom.

The blood in the urine comes and goes, or is absent altogether.

The cachectic condition is not developed until after the tumor has existed for some time.

The only effective treatment is the removal of the tumor.

RENAL CALCULI.

The solid constituents of the urine may be precipitated in the form of sand, gravel, or calculi.

The calculi are formed of uric acid, of uric acid with a shell of oxalate of lime, of oxalate of lime, of the phosphates, or of cystine.

They vary as to their number, size, and shape. They may be formed in the pelvis of one kidney, or of both. They may remain in the pelvis of the kidney, or become impacted in the ureter, or pass through the ureter into the bladder.

Causes.—Renal calculi are found in persons of all ages; they are more common in males than in females. A sedentary life; gout; any conditions which produce an exaggerated quantity of uric acid, of oxalate of lime, of phosphates, or of cystine; and inflammation of the mucous membrane of the pelves of the kidneys, act as causes.

Symptoms.—Small calculi may pass through the ureters into the bladder without causing any symptoms.

Larger calculi, as they pass through the ureters, produce attacks of renal colic. During an attack of renal colic the patients have severe pain, coming on suddenly or gradually, referred to the kidney and ureter, and sometimes radiating in different directions.

The testicle is retracted, sometimes painful, sometimes swollen.

There may be attacks of syncope, or of general convulsions.

Vomiting is often a distressing symptom. There may be a rise of temperature.

The urine is passed frequently, in small quantities, and may contain blood.

If the patient only has one kidney, or if calculi pass at the same time into the ureters of both kidneys, there is complete suppression of urine. If this suppression lasts for many days, the patients die in the condition of chronic uræmia.

Most attacks of renal colic only last for a few hours ; but they may be protracted, with intermissions, for a number of days.

The same patient may have one attack, or several.

The Treatment of an attack of renal colic is directed to the relief of the pain, and to hastening the passage of the calculus. The means usually employed are hypodermic injections of morphine, inhalations of ether or chloroform, and the hot bath.

A calculus after passing into the ureter may become impacted there, and either partially or completely obstruct the passage of urine.

The patients first have an attack of renal colic. After this either hydro-nephrosis, or chronic pyelo-nephritis, is developed.

The hydro-nephrosis usually does no great harm ; but a pyelo-nephritis is a dangerous lesion.

The only efficient treatment is to cut down and remove the calculus.

The calculi may remain in the pelvis of the kidney.

In some of these cases there are never any symptoms, although the kidney may become atrophied.

In other cases there are several attacks of pain and hæmaturia, which finally cease, and the patient remains well.

The worst cases are those in which the calculus sets up a chronic pyelo-nephritis. These patients have pain over the kidney, continuously or in attacks. The urine at intervals contains blood and pus. If the other kidney becomes the seat of chronic diffuse nephritis, albumin and casts are also present in the urine.

The kidney may be so much enlarged as to form a tumor.

The patients lose flesh and strength, with more or less fever. They die with waxy degeneration of the viscera, or with chronic Bright's disease.

The treatment is to cut down and remove the calculus from the pelvis of the kidney, if the symptoms are so severe as to threaten the patient's life.

Occasionally we find patients with very large branching concretions occupying the pelves and calyces of both kidneys, who behave as if they had chronic diffuse nephritis without exudation.

To prevent the formation of uric acid calculi, we regulate the diet by excluding starches and sugars, and insist on sufficient exercise. If possible, the patient should spend several weeks every year at one of the natural alkaline springs. If this is not possible, the patient should take regularly one of the alkalies largely diluted with water.

To prevent the formation of phosphatic calculi, we must correct all errors of digestion, and see that the patient takes enough exercise.

PERINEPHRITIS.

Lesions.—There is an exudative inflammation of the connective tissue beneath and around the kidney, which usually goes on to the formation of an abscess.

The abscess extends backward into the muscles of the back, or upward, or downward. It may perforate through the skin of the back, or into the peritoneal cavity, or into the colon, the bladder, the vagina, or through the diaphragm. The kidney is compressed by the abscess, or invaded by the suppurative inflammation.

Causes.—Abscesses produced by caries of the spine, or pelvic cellulitis, may cause a perinephritis.

Typhus and typhoid fever and small-pox may be complicated by perinephritis.

The inflammation may be caused by exposure to cold, by contusions, after severe muscular exertion, or may occur without discoverable cause.

It is especially common in persons between the ages of twenty and thirty years.

Symptoms.—There are at first pain and tenderness in the lumbar region, chills, and a febrile movement.

There may also be vomiting. The patient feels sick, and soon is glad to remain in bed. After one or two weeks the skin over the lumbar region becomes œdematous and red. The corresponding thigh is kept flexed, and to move it gives pain. As the abscess grows larger, there is more and more bulging of the lumbar region. Or there will be added the symptoms of the perforation of the abscess into the peritoneum, the colon, the bladder, or the pleura.

Perforation into the peritoneum is regularly fatal. If the pus escapes into the colon or bladder, the suppuration is apt to become chronic, and the patients die with waxy viscera.

Treatment.—During the early days of the inflammation we employ continuous cold, and small doses of calomel or sulphate of magnesia. When the abscess is formed, it is to be opened as soon as possible.

GLYCOSURIA.

SUGAR may be present in the urine as a temporary condition, or persist in moderate quantity for some time, although the patients do not have diabetes.

Certain poisons may cause temporary glycosuria : curara, carbonic acid gas, nitrite of amyl, morphine, chloral hydrate, cyanide of potash, sulphuric acid, mercury, alcohol, and chlorofrom.

With some of the infectious diseases sugar may be found in the urine : cholera in the stage of reaction, anthrax, diphtheria, typhoid fever, scarlatina, remittent fever, and cerebro-spinal meningitis.

Gastric catarrh, functional disorders of the liver, gout, and imperfect digestion of sugars and starches, may be accompanied by the presence of sugar in the urine.

Sugar may also be found in the urine after mental emotions, trigeminal neuralgia, concussion of the brain, cerebral apoplexy, with atrophied kidneys, and during pregnancy.

Such a temporary presence of sugar is usually not of importance, but it may be followed by diabetes.

DIABETES MELLITUS.

This is a disease characterized by an increased production of urine, by the presence of sugar in the urine, and by changes in the general health of the patient.

Causes.—In adults the disease is twice as common in men as in women. It is especially frequent in young and middle-aged adults, but it is not rare in children and old persons. It is more prevalent among the well-to-do than among the poor. It is found in nearly all parts of the world, but is more prevalent in some localities than in others. There seems to be an inherited predisposition to the disease.

Lesions.—No characteristic lesion of the disease has yet been discovered.

In a very few patients, tumors of the medulla, the pons, or the cerebellum have been found.

In some patients there have been seen in the medulla dilatation of the blood-vessels, small hemorrhages, or foci of small round cells around the vessels.

The lungs may show the lesions of phthisis, or of gangrene. The pancreas may be atrophied. The liver may be fatty. The kidneys may show the lesions of acute or chronic nephritis, or in the epithelium of Henle's loops glycogen may be present in transparent masses.

The nature of the disease is still involved in obscurity.

In health the blood contains a moderate quantity of sugar. The blood in the portal veins contains the sugar absorbed from the intestines, and sugar is formed in different parts of the body. In diabetes the quantity of the sugar in the blood is too large, and consequently it is excreted with the urine; but why there is too much sugar in the blood we do not know.

Symptoms.—The invasion of the disease is usually slow and gradual. The patients have an unnatural thirst, or they pass too large a quantity of urine, or they find that they are losing flesh and strength, or there is bleeding from the gums.

Rarely the invasion of the disease is more acute.

When the disease is fairly established the quantity of the urine is much increased, and it contains considerable quantities of sugar. The thirst is apt to be very annoying, and there may also be unnatural hunger. The patients lose flesh and strength. The skin and the mucous membranes are dry. The functions of the stomach and intestines are disturbed. The teeth become carious, and the gums are unhealthy and bleed.

The patients may, in addition, have furuncles, pulmonary phthisis, acute or chronic nephritis, gangrene of the feet, or cataract.

The patients are liable to the very fatal set of symptoms called diabetic coma. These symptoms may be developed in one of three ways:

1. After some unusual bodily or mental exertion, the patients suddenly feel very weak. The skin is cold, the pulse is feeble, they become stupid, then comatose, and die in a few hours.

2. For from six to nine days the patients complain of weakness, constipation, loss of appetite, slight drowsiness, breathlessness, and pain in the abdomen. Then come on headache, restlessness, delirium, abdominal pain, rapid and labored breathing, cyanosis, a feeble and rapid heart, stupor, and coma. The patients die within a few days.

3. There is no dyspnœa, or prostration; but sudden headache, vertigo, stupor, coma, and death within a few hours.

No satisfactory explanation has yet been offered of these attacks of diabetic coma.

The disease usually runs a long course, sometimes better, sometimes worse.

A moderate number of the patients recover completely.

In a very large number of patients the disease can be controlled and they enjoy fair health, although they do not get well.

A considerable number die in an attack of diabetic coma. Others die of complicating phthisis, or Bright's disease. A few die emaciated and exhausted from the diabetes alone.

Children, as a rule, do much worse than adults.

Treatment.—We usually try, first, the regulation of the diet and of the mode of life. If these are not successful, we must add the use of drugs.

The regulation of the diet consists in cutting off from the food the sugars and starches.

The patients may eat: Meat, fish, soups, almond, bran, or gluten bread, eggs, cream, butter, cheese, oil, spinach, turnips, beans, cauliflower, cabbage, asparagus, lettuce, celery.

They must not eat: Sugar, wheaten bread, rice, sago, arrowroot, tapioca, macaroni, potatoes, carrots, parsnips, beets, peas, onions, and fruits.

They should not drink wines, or liquors.

It is necessary, however, to take the greatest care not to exclude the starches and fruits so rigidly that the patients are insufficiently fed.

The regulation of the mode of life consists in seeing that the patients lead an out-of-door life, with sufficient exercise.

The drugs which are ordinarily used are: The preparations of opium. The bicarbonate and salicylate of soda, about one hundred grains daily. The alkaline waters of Carlsbad and Vichy. The sulphide of calcium, one-quarter of a grain to two grains four times a day. Clemen's solution of bromide of arsenic, five to twenty minims three times a day. The carbonate of lithia and arseniate of soda dissolved in large quantities of water. Iodoform, one-half a grain to two grains three times a day. Jambol in powder, ten grains three times a day. Antipyrin, ten to twenty grains three times a day. Pilocarpine, one-twelfth of a grain twice a day.

DIABETES INSIPIDUS.

This is a disease characterized by the passage of large quantities of urine of low specific gravity; the condition not being due to disease of the kidneys.

Causes.—The disease usually occurs in young adults. It is more common in males than in females. We know nothing concerning its nature and causes.

Symptoms.—The patients pass large quantities of urine of low specific gravity. They complain of continual thirst, of loss of flesh, of disturbances of digestion, and of a variety of hysterical and nervous symptoms.

In some of the patients the disease is readily relieved by treatment; in others it is persistent and annoying; but even in the worst cases it is not fatal.

Treatment.—The drugs ordinarily employed are:

ergot, gallic acid, the preparations of valerian, or the mineral acids. Some patients are benefited by the exclusive diet of meat and hot water.

PERIODIC, OR PAROXYSMAL, HÆMATINURIA, OR HÆMOGLOBINURIA.

1. *Idiopathic Cases.*

Causes.—This condition has been observed in persons of all ages, but more frequently in females than in males. Similar conditions can be produced experimentally in animals by injecting into their veins distilled water, glycerine, or pyrogallic acid.

In man the attacks are often produced by a sudden cooling of the skin.

There is apparently, at the time of an attack, first a sudden destruction of red blood-cells and liberation of their hæmoglobin in the general circulation ; second, an excretion by the kidneys of the hæmoglobin which has thus been liberated.

The Symptoms manifest themselves in paroxysms. Between the paroxysms the urine is normal, and the patients seem to be well.

The paroxysms commence with chilliness, or a chill lasting from half an hour to two hours. At the same time nausea, vomiting, and more or less prostration are present. After the chill there may, or may not, be a rise of temperature. The first urine passed after the chill is of red or brown color, as if mixed with blood. It contains, however, no blood-cells, only hæmoglobin. The specific gravity of the urine remains unchanged ;

albumin and casts are present. The hæmoglobin is found in the urine for one or more days after the chill.

The attacks may be repeated several times a day, or at longer intervals. They may be repeated a number of times during a month, stop for several months, and then begin again.

The patients may also be troubled by disturbances of digestion, and some loss of flesh and strength.

All of the patients seem, after a time, to recover.

Treatment is directed to improvement of the general health, and avoidance of cooling the skin.

2. *Malarial Cases.*

A patient may have a number of ordinary paroxysms of intermittent fever, and then one or more paroxysms followed by the appearance of hæmoglobin in the urine.

The malignant forms of remittent fever are sometimes accompanied by the presence of hæmoglobin in the urine.

PERITONITIS.

Acute General, or Local Peritonitis.
Chronic General, or Local Peritonitis.
Tubercular Peritonitis.

I. ACUTE PERITONITIS.

Lesions.—There are two anatomical forms of acute peritonitis: a productive inflammation with the growth of cells, and an exudative inflammation with the production of serum, fibrin, and pus.

1. *Cellular Peritonitis.*—The peritoneum is congested and without its natural glistening appearance. There is an increase in the size and number of the endothelial

cells, but neither fibrin, serum, or pus are present. The intestines are distended with gas.

2. *Exudative Peritonitis.*—The peritoneum is at first congested. Its surface is coated with fibrine, or with fibrin and pus, which makes adhesions between the opposed surfaces of peritoneum. In the peritoneal cavity, or shut in by adhesions, are collections of purulent or brownish serum. The subperitoneal tissue may be infiltrated with pus-cells. The intestines are distended with gas. In the more prolonged cases there is a growth of new connective tissue-cells, and a formation of permanent thickenings and adhesions after the absorption of the serum, fibrin, and pus.

Causes.—Cellular peritonitis seems to be caused simply by some irritant. Exudative peritonitis is caused by an irritant and by the growth of pathogenic bacteria.

The ordinary causes of peritonitis are wounds and contusions of the abdomen.

Wounds, ulcers, new-growths, incarcerations, intussusceptions, ruptures, perforations, and inflammations of the stomach and intestines.

Inflammations of the vermiform appendix.

Injuries and inflammations of the uterus, ovaries, and Fallopian tubes.

Rupture and inflammation of the bladder. Inflammation of the kidneys.

Abscesses and hydatid cysts of the liver. Inflammation of the gall-bladder.

Inflammation of the spleen, pancreas, lymphatic glands, retro-peritoneal connective tissue, vertebræ, ribs, pelvic bones, and pleura.

Thrombosis of the portal vein. Peritonitis may complicate septicæmia, the infectious diseases, and Bright's disease.

Symptoms.—The symptoms of the invasion vary with the character of the cause of the peritonitis. With an idiopathic peritonitis the invasion is sudden, or more gradual.

More or less chilliness exists during the first day, and may be repeated later. The temperature rises, but runs a very irregular course. In some patients it is high throughout the disease ; in others it rises and falls irregularly ; in still others it will hardly be above 99° F.

The intestines become distended with gas, and the abdomen is swollen and tense. Such a tympanitic condition belongs regularly to general peritonitis, but it is also found with the localized forms of the inflammation.

In most cases pain and tenderness exist over those portions of the abdomen where the peritonitis is going on. The pain is increased by pressure, by motion, and by the act of breathing. The patients lie on their backs, with their knees drawn up, and move the diaphragm as little as they can. It is, however, not a very rare exception for the pain to be absent altogether.

There is vomiting of food, of green or brown fluid, or of stercoraceous matter. Often there is no active vomiting, but every few hours there is a regurgitation of brownish fluid and of whatever food the patient has taken. There is often much difficulty in getting the patients to retain any nourishment at all.

The bowels are usually constipated, but sometimes there is diarrhœa.

The pulse is rapid and feeble.

The breathing is rapid and shallow.

The patients rapidly lose flesh and strength.

The tongue becomes dry and brown.

The mind may remain clear, or alternating stupor and delirium are developed.

After childbirth there may be an infection of and through the uterus, which gives symptoms like those of peritonitis, although a real peritonitis is not always present.

1. A portion of the membranes or a blood-clot, by the third or fourth day after childbirth, may become putrid, with the growth of bacteria and the formation of ptomaïnes. The patients at once have chills, fever, marked prostration, pain and tenderness, and tympanites. If the putrid substance is expelled from the uterus, all these symptoms cease. If it is retained in the uterus, a true peritonitis may be developed.

2. There is an endometritis with pus and fibrin coating the inner surface of the uterus, and infiltrating its wall.

3. There is thrombosis of the uterine veins. With either of these conditions there may be a pelvic, or a general, peritonitis. But even if the peritonitis is not present, the symptoms are much the same.

Treatment.—We may treat an acute peritonitis as we would any other acute exudative inflammation, by rest in bed, the local application of cold, repeated small doses of calomel or the sulphate of magnesia, and small doses of opium.

Or we may adopt the opium treatment, which consists in giving such doses of opium, at regular intervals, as will keep the patient in a condition of semi-narcotism until the peritonitis has run its course.

Inflammation of the Vermiform Appendix.

The vermiform appendix is given off from the inner and posterior aspect of the lower end of the caput coli. It is from three to six inches in length. It is composed of a peritoneal, muscular, and glandular coat. It may be turned upward behind the cæcum, or it may hang downward free in the peritoneal cavity.

Lesions.—1. There may be a catarrhal inflammation of the mucous membrane of the appendix; this usually gives no symptoms.

2. There is an exudative inflammation of the entire wall of the appendix. The wall is infiltrated with fibrin and pus, but there is no necrosis of the wall or perforation. If the appendix is behind the cæcum, or if adhesions are formed early, the inflammation is localized. If the appendix is free in the peritoneal cavity and no adhesions are formed, a general peritonitis is soon established.

3. There is an exudative inflammation of the appendix, with necrosis, sloughing, and perforation at one or more parts of its wall. This is regularly attended with the formation of an abscess behind the cæcum, or in the peritoneal cavity.

4. The entire appendix becomes rapidly gangrenous with the formation of an abscess, or a general peritonitis.

5. A patient may recover from the exudative inflammation, or from the inflammation with perforation, and then have subsequent attacks of the same character.

Causes.—The disease is most common in persons between the ages of ten and thirty years, but older persons are not exempt. In many cases a fecal concretion, or a foreign body, is found in the appendix, which may be the cause of the inflammation.

In typhoid fever, and in dysentery, there may be an inflammation of the appendix as a part of the lesions of either disease.

Symptoms.—These depend upon:

The inflammation of the appendix.

The localized peritonitis.

The formation of an abscess.

The general peritonitis.

The general infection produced by the infectious inflammation.

The cases group themselves as follows:

1. Cases which terminate in resolution. The patients may, for hours or days before the attack, complain of colicky pains, constipation, diarrhœa, or a diffuse pain over the entire abdomen. Or, without any such premonitory symptoms, the invasion is abrupt.

There are chills, or chilliness, a rise of temperature, vomiting, pain and tenderness in the right iliac region, within forty-eight hours a decided feeling of fulness and resistance in the right iliac region. These symptoms continue for one or two weeks and then subside, and the patients recover. The patients may have no further trouble; they may have pain from time to time from the adhesions; or they may have fresh attacks of inflammation of the appendix.

Such a course of the disease means that the inflamed appendix is situated behind the cæcum, and that no abscess is formed.

Treatment.—These patients do so well that operative treatment seems hardly necessary. Rest in bed, a fluid diet, emptying of the rectum by enemata, and the application of continuous cold over the right iliac region, are the essential parts of the treatment.

2. Cases with the formation of an abscess. The symptoms begin, as in the preceding set of cases, with premonitory symptoms, or abruptly. But although the symptoms are the same, they are much more severe. By the end of a week the abscess is formed. There is now a more distinct tumor, and the patients give evidences of septic poisoning. The position of the abscess varies with that of the appendix. At any time a general peritonitis may be set up by extension of the inflammation, or by rupture of the abscess.

The abscess may perforate into the peritoneal cavity, the bladder, or the colon. There may be suppurating tracts which extend backward, upward, or downward.

The patients die with evidences of septic infection, or of general peritonitis. A small number recover with escape of pus into the colon, or its gradual absorption.

The treatment is to cut down on the inflamed appendix, and remove it as soon as the diagnosis can be made. For in all these cases there is inflammation and perforation of the appendix, and the formation of an abscess.

3. Cases in which there is an exudative inflammation of the appendix with or without perforation ; the appendix is not behind the cæcum, no adhesions are formed ; a general peritonitis is soon developed.

For a few hours, or for two or three days, the patients complain of malaise, nausea, vomiting, constipation or diarrhœa, and abdominal discomfort. They do not seem to be very ill, and are not confined to bed. Then comes suddenly the development of an acute general peritonitis, with marked prostration, fever, diffuse pain and tenderness over the abdomen, vomiting, tympanites, a brown, dry tongue, and an anxious face. The patients get worse rapidly, and die in a few days.

Treatment.—The proper treatment is to operate and remove the inflamed appendix as soon as possible. The difficulty is to make the diagnosis before the development of the peritonitis. After the peritonitis is established, the operation is not often successful.

4. Cases in which the entire appendix becomes gangrenous within a few hours. The patients complain first of general malaise, chilliness, nausea, vomiting, constipation or diarrhœa, pain and tenderness in the right iliac region, and a rise of temperature. Within twenty-four hours the patients look as if they were suffering from an infectious disease. The pain and tenderness in the right iliac region continue; there is a feeling of resistance in this region, and if an abscess is formed, a more distinct tumor. The temperature does not run very high, but the pulse is rapid and feeble, and the patients look more and more as if they were poisoned. The abdomen becomes tympanitic, the stomach ceases to retain food, and the patients die at the end of a few days.

Treatment.—An operation at the earliest possible moment is indicated in these patients. But even with an operation they are very unfavorable cases.

II. CHRONIC PERITONITIS.

1. Peritonitis with connective-tissue adhesions.
2. Peritonitis with connective-tissue adhesions and the production of serum, fibrin, and pus.
3. Peritonitis with thickening of the peritoneum.

1. *Peritonitis with adhesions.*

Causes.—Such a chronic peritonitis may follow an acute peritonitis; it may be due to abscesses in the abdominal cavity, or in the wall of the abdomen; it may be a primary chronic inflammation without discoverable cause.

Lesions.—We find after death threads and membranes of connective tissue, which join together adjacent surfaces of peritoneum in a great variety of ways. The cases vary as to the number and extent of the adhesions.

Symptoms.—With but few adhesions, there are no symptoms, or only occasional attacks of pain, apparently brought on by flatulence.

With extensive adhesions, chronic catarrhal inflammation of the stomach and bowels, with their characteristic symptoms, are established. Often we can appreciate by palpation that the intestines are matted together. The patients lose flesh and strength, but seem to die rather from some intercurrent disease than from the peritonitis. In such patients there is always danger of strangulation of the intestine.

The treatment is directed principally to the disturbance of the functions of the stomach and bowels.

2. *Peritonitis with adhesions and the production of serum, fibrin, and pus.*

Causes.—This follows acute peritonitis; it is caused by diseases of the uterus and its appendages, by localized peritonitis, and by abscesses in the peritoneal cavity. It may begin as a chronic inflammation without discoverable cause.

Lesions.—The adhesions mat together the coils of intestine, and divide up the abdominal cavity in a variety of irregular ways. The free surface of the peritoneum is coated with fibrin and pus. Purulent serum, in small or large quantities, occupies the peritoneal cavity, or is shut in by adhesions.

Symptoms.—If the chronic peritonitis is secondary, there is the previous history of the localized peritonitis, or abscess. If it is primary, the invasion is slow and obscure.

The patients suffer from more or less abdominal pain and tenderness.

The physical signs vary with the extent and distribution of the adhesions, and the quantity of serum.

Constipation, or diarrhœa, are often present, but it is possible for the bowels to move regularly throughout the disease. In most patients there is an irregular febrile movement, but there may be no rise of temperature for months.

The heart's action and pulse are rapid and feeble.

There are symptoms of gastric dyspepsia, and the stomach becomes less and less able to digest and retain food.

The patients steadily lose flesh and strength, and die emaciated and feeble after a protracted illness.

3. *Peritonitis with thickening of the peritoneum.*

Causes.—This form of peritonitis seems to be a primary inflammation, and to belong to adult life, but we are entirely ignorant as to its causes.

Lesions.—We find after death a general, diffuse growth of dense connective tissue, forming a thickening of the parietal and visceral peritoneum. There may also be more or less serum in the peritoneal cavity.

Symptoms.—The only physical signs are those belonging to the presence of fluid in the abdominal cavity.

The symptoms depend largely upon the interference with the functions of the stomach, intestines, and liver.

The thickening of the peritoneal coat of the stomach is attended with contraction of the organ, and catarrhal inflammation of its mucous membrane. The patients suffer from pain, vomiting, and failure of gastric digestion.

The intestines become the seat of a chronic catarrhal enteritis, with disturbance of the functions of the small and large intestine.

The thickening of the capsule of the liver diminishes the size of this organ, interferes with the portal circulation, and produces ascites.

The patients gradually lose flesh and strength, and die.

III. TUBERCULAR PERITONITIS.

Lesions.—There is a localized tubercular inflammation which involves the larger part of the visceral and parietal peritoneum, the tubercle-tissue being in the form of miliary tubercles, nodules, or plates. Besides the tubercle-tissue, serum in large quantities, fibrin, or organized adhesions are present.

After a time there may be a secondary formation of miliary tubercles in other parts of the body.

Causes.—Tubercular peritonitis occurs both in children and adults. It is either a primary inflammation, or secondary to tubercular inflammations of other parts of the body.

Symptoms.—The physical signs are those of fluid in the peritoneal cavity; or of large quantities of fibrin which fill up all the interstices between the abdominal viscera and distend the abdomen; or of connective tissue adhesions which mat the intestines together.

The symptoms are those of a chronic peritonitis which progresses steadily or without intermissions.

The patients lose flesh and strength and become anæmic. Pain and tenderness over the abdomen, vomiting, constipation or diarrhœa, and an irregular febrile movement, are present to a greater or less degree.

Treatment.—It has been found, in a number of cases of tubercular peritonitis, that the operation of opening the peritoneum and washing out the peritoneal cavity is followed by a decided improvement in the condition of the patient.

CARCINOMA OF THE PERITONEUM.

Lesions.—Primary carcinoma of the peritoneum occurs in the form of colloid cancer, or of hard nodules composed of a connective-tissue stroma enclosing cavities which contain cells of epithelial type.

The growths are regularly multiple, and grow in many different parts of the peritoneum. The tumors may all be of small size, or some of them reach a diameter of several inches ; or, in the case of colloid cancer, very large tumors may be formed.

With the new-growth there is a production of serum, or of fibrin, or of connective-tissue adhesions, or a general thickening of the peritoneum.

Causes.—The disease belongs to persons over forty years of age.

Symptoms.—The physical signs depend upon the size of the tumors, the serum, and the adhesions.

The invasion of the symptoms is slow and gradual, and some time elapses before the patients seem to be seriously ill.

Disturbances of the stomach and intestines, more or less pain, and constant loss of flesh and strength, are the prominent symptoms.

RHEUMATISM.

It is customary to speak of acute articular rheumatism, subacute rheumatism, chronic rheumatism, muscular rheumatism, gonorrhœal rheumatism, rheumatoid arthritis, scarlatinal rheumatism, and puerperal rheumatism as if they were all varieties of one and the same disease. We are, however, not sufficiently acquainted with the nature of most of these so-called rheumatisms to tell how nearly they are or are not related to each other.

ACUTE ARTICULAR RHEUMATISM.

This is an acute, general disease of which the characteristic lesion is an inflammation of the joints and of some of the connective-tissue membranes.

Lesions.—The joint-lesion is an acute exudative inflammation of the synovial membranes with congestion and an exudation of serum, but only rarely a production of pus or fibrine.

Of the connective-tissue membranes the pericardium and the endocardium are the ones most frequently inflamed; less often the pia mater, the pleura, and the peritoneum.

There may also be inflammations of the iris, the pharynx and tonsils, and the lungs.

Causes.—The disease is most common in the temperate zones, but it is also observed in both cold and warm climates. The attacks are not confined to any one season of the year.

The time of greatest liability to the disease is between the ages of ten and thirty years. There seems to be both an hereditary and a personal predisposition to the disease, and the same individual often suffers from several attacks. The strong and vigorous, and the feeble and debilitated, seem to be equally liable to the disease. Exposure to cold and wet may often act as exciting causes.

Symptoms.—The symptoms of the disease may begin in several different ways.

1. For a few hours, or for several days, the patients complain of general malaise, headache, irregular chills, a little fever, irritability, sleeplessness, a coated tongue, no appetite, urine loaded with urates, and irregular pains about the joints.

2. There are pain and stiffness of one or more joints, gradually increasing, and followed, after some hours, or days, by fever.

3. The invasion is sudden—chills, a rapid rise of temperature, and inflammation of one or more joints.

When the disease is established there is a febrile movement, the pulse is full and rapid, the skin is hot and dry or bathed in acid perspiration, the tongue is coated, nausea and vomiting are often present, the bowels are constipated, the urine is diminished in quantity and loaded with urates, the intelligence is clear, but restlessness and sleeplessness are apt to be marked features.

One or more joints are inflamed, swollen, painful, and tender. The cases vary as to the severity of the pain, the intensity of the synovitis, the number of joints inflamed, and the way in which one joint after another is involved.

Complications: 1. *Hyperpyrexia.*—The disease begins mildly or severely. It runs its ordinary course for a few days and then the temperature rises rapidly, while the inflammation of the joints subsides. The sweating ceases, the tongue becomes brown and dry, the pulse is rapid and feeble, the breathing is rapid, the patients suffer from restlessness, sleeplessness, headache, hyperæsthesia of the skin, muscular twitchings, general convulsions, delirium, and coma. They usually die in a few days.

2. *Pericarditis and Endocarditis.*—These inflammations are especially common in young persons. They occur both in mild and severe cases. They usually follow the joint-lesion, but may precede it, or even occur without it.

If a pericarditis is developed the temperature rises, the pulse is more rapid, there is præcordial pain, and more or less dyspnœa. The physical signs vary with the presence of fibrine alone, or of both fibrine and serum.

Some of the cases recover completely, others recover but with permanent pericardial adhesions, while still others die from the pericarditis.

If an endocarditis is developed there is a rise in the temperature, the patients look worse, the heart's action becomes rapid, tumultuous, or irregular; after one or two days a valvular murmur can be heard. After the patients have recovered, the valves which have been inflamed are left permanently damaged.

3. Complicating inflammations of the pia mater, pleura, or lung give their ordinary symptoms.

Duration.—The regular duration of an attack of acute articular rheumatism seems to be three weeks, but the disease may run its course within a few days; it may last for months, or its course may be protracted by relapses.

Terminations.—Some of the patients recover completely and never have another attack of the disease.

Others suffer from a number of attacks at short or long intervals.

In some the rheumatism runs its course, but one joint remains inflamed.

In some the convalescence is unusually prolonged, the patients remain feeble and anæmic, with stiff and tender joints.

In a considerable number the pericarditis or endocarditis lays the foundation of serious cardiac disease.

Death in the course of acute rheumatism is usually due to hyperpyrexia, pericarditis, endocarditis, pneumonia, pleurisy, or meningitis.

Treatment.—1. Of mild cases with inflammation of only one joint. These can often be very well managed by the application of continuous cold to the inflamed joint, with small doses of opium.

2. Of the regular well-marked cases. The majority of these are to be treated by the salicylate of soda, 10 to 20 grains every two hours; the oil of wintergreen, 20 minims every two hours; or salicin, 10 to 20 grains

every two hours. The dose of these medicines is diminished as the disease subsides. The favorable effect of these remedies is seen in the improvement of the constitutional symptoms and the inflammation of the joints. They do not seem to shorten the duration of the disease, or lessen the liability to complicating inflammations.

Some patients, however, are not at all benefited by the use of these drugs; others get their poisonous instead of their medicinal effects.

There are fat, florid, overfed patients who, when they have an attack of acute rheumatism, are best treated by alkalies.

The patients are given ʒ ij. of bicarbonate of potash in solution, with ℥ j. of lemon-juice, every three hours for four days. After this they take 30 grains of bicarbonate of potash with 3 grains of quinine dissolved in lemon-juice three times a day. The bowels are to be kept open every day.

There is a group of cases characterized by excessive pain in the joints, without very much inflammation of them. The best remedies for these patients are phenacetine in 5-grain doses every two hours, antipyrine in 10 to 20-grain doses every two hours, or salol in 5-grain doses every two hours.

There are feeble and anæmic patients who, when they have an attack of acute rheumatism, are not benefited by any of the drugs which have been mentioned. They have to be treated by the iodide of potash, iron, quinine, and cod-liver oil.

Patients with the gouty diathesis, when they have acute rheumatism, often improve more rapidly if we combine colchicum with some of the drugs already mentioned.

Cases complicated by hyperpyrexia are to be treated by cold baths.

If the patients recover from their rheumatism, but one joint remains inflamed ; this joint is to be treated first by the application of cold, then by rest and pressure, and then by massage and passive motion.

The protracted convalescence is to be treated by change of climate, iron, quinine, and strychnine.

SUBACUTE RHEUMATISM.

In this form of rheumatism the invasion of the symptoms is gradual. The patients lose their appetite, the bowels are constipated, the tongue is coated, they become anæmic, feeble, and emaciated. A number of the joints are moderately inflamed, a little swollen, somewhat painful and tender. There may be a complicating endocarditis.

The disease is apt to last for a long time and to recur a number of times in the same patient. Its treatment is often very unsatisfactory.

We employ the salicylate of soda, antipyrine, phenacetine, iron, quinine, strychnine, quinine, the alkaline and sulphur mineral waters and baths, massage, and change of climate.

MUSCULAR RHEUMATISM.

This is an affection of the muscles, apparently of inflammatory character, which causes them to become painful and tender. The muscles most frequently affected are those of the shoulder, neck, and back.

Causes.—The disease is especially common in adult life. The same person often suffers from a number of attacks. There is frequently a distinct history of exposure of the affected muscles to a draught of cold air. Similar conditions of the muscles are developed after over-exertion and as a complication of scarlet fever.

Symptoms.—The disease occurs in different degrees of severity.

1. One or more muscles, within a few hours, become painful on motion. If the muscles are not moved there is no pain. There is no constitutional disturbance, and the patients continue to feel well. The muscles remain in this condition for days or weeks. Hardly any treatment is necessary.

2. There is not only pain on motion in the affected muscles, but also pain when they are at rest, and this pain comes on in paroxysms which are exceedingly severe.

3. A large number of the muscles of the back are involved, the pain is severe, there is some rise of temperature, and the patients feel sick.

These more severe cases require treatment. We use as local applications mustard-plasters, hot fomentations, and the faradic current. The most efficient drugs seem to be phenacetine, antipyrine; or the iodide of potash and gelseminum given together.

GONORRHŒAL RHEUMATISM.

This name is given to an inflammmation of the joints, and the tissues about them, which has nothing to do with real rheumatism, but is a specific inflammation accompanied with the growth of the same bacteria which are found with the specific urethritis.

There are two varieties of gonorrhœal rheumatism :

1. There is an inflammation of the tissues around the joints, with diffuse swelling, pain, tenderness, and redness of the skin. The ankle-joints are those most frequently involved, but the wrists and the other joints may be affected in the same way.

The inflammation is of acute or subacute character, and is apt to be long and tedious. It terminates in complete recovery, in stiffening of the joints, or in suppuration.

Treatment.—The inflammation is to be treated first by the continuous application of cold, then by rest and pressure, and finally by massage and passive motion.

2. There is a subacute synovitis, which involves most frequently one of the knee-joints. The joint is distended with serum, the inflammation may become purulent, and end in destruction of the joint.

Treatment.—Extension, pressure, or the opening and scraping of the joint are the methods of treatment.

CHRONIC RHEUMATISM.

Lesions.—A chronic inflammation begins in the synovial membrane of one or more joints. The inflamed membrane becomes dense and thick, the fluid within the synovial sac is usually scanty and grumous, sometimes abundant and serous. The inflammation may extend to the capsules and ligaments of the joints, the articular cartilages, and the bones.

As complicating lesions we find chronic endocarditis, chronic endarteritis, pulmonary emphysema and bronchitis, and chronic nephritis.

Causes.—The disease belongs to adult life and to old age. It is especially common among the poor and among persons who are constantly exposed to all sorts of weather. In some persons the course of the chronic rheumatism is varied by attacks of acute rheumatism.

Symptoms.—The symptoms are principally the local symptoms of the inflamed joints. But from time to time there may be a little rise of temperature, and, after a while, digestive disturbances, loss of nutrition, and the symptoms belonging to the complicating lesions are developed.

The inflammation begins in one or more joints, often those of the hands and feet, continues in these joints and then gradually extends to others, until in the worst cases nearly all the joints in the body are involved. The affected joints are tender and painful, swollen, sometimes fluctuating, sometimes stiff, sometimes creaking. The course of the inflammation is slow, with remissions and exacerbations.

The patients vary as to the position and number of the joints inflamed, and as to the extent of the changes in the joints.

The prognosis is always bad, but yet in some patients the disease never cripples them completely.

The only efficient treatment consists in the use of the natural mineral waters taken internally and as baths. The best waters seem to be those of Sharon, Richfield, Virginia, North Carolina, Arkansas, Wiesbaden, and Aix-les-Bains.

ARTHRITIS DEFORMANS.

Synonyms.—Rheumatoid Arthritis, Rheumatic Gout, Rheumatisme Noueux, Chronic Rheumatism.

Lesions.—There is a chronic inflammation of the joints which, from the outset, involves the cartilages, bones, and synovial membranes—a chronic pan-arthritis. The articular ends of the bones become thickened, flattened, and deformed by outgrowths of bone ; the cartilages are softened, eroded, and destroyed ; the synovial membranes are thickened. The joints become stiffened, deformed, sometimes dislocated.

Causes.—The cases in which the joints of the hands and feet are affected are most common in adult females belonging to the poorer classes. The form which involves the larger joints is most common in adult males. It is, however, possible for either form of the disease to occur in children.

Symptoms.—The arthritis comes on slowly and gradually. Usually the joints of the hands and feet are first involved, but any one of the larger joints may be the first affected. The natural tendency of the disease, as it advances, is to attack one joint after another.

The inflamed joints become painful and tender ; then gradually stiffened, swollen, deformed, and dislocated. The corresponding muscles become contractured and atrophied. From time to time there may be exacerbations of the arthritis, with a rise of temperature.

The course of the disease is slow, but progressive. The patients become more and more helpless; digestive disturbances are developed; loss of flesh and strength, and anæmia become more and more marked. The condition of the patient is rendered still worse by complicating lesions: Bronchitis, chronic nephritis, emphysema, and chronic endartertis.

The treatment is very unsatisfactory. The only thing that seems to be of any service is the use of the natural mineral waters and baths.

GOUT.

It is customary to describe acute gout, chronic gout, and irregular gout.

Our notions concerning the true nature of gout can hardly be considered as settled. But at the present time the views of Garrod are accepted as a probable theory.

Gouty inflammations of the joints are caused by the deposition of urate of soda in the articular cartilages. The functions of the kidneys are disturbed, and, after a time, they become the seat of a chronic diffuse nephritis with little or no exudation. During an attack of gout the blood becomes less alkaline, or there is an increase of uric acid in it, or there is a diminished excretion of uric acid by the kidneys.

Lesions.—The blood before and during an attack of gout contains an increased quantity of urate of soda. In chronic and irregular gout there is always an increase of urate of soda in the blood.

In the joints there is an acute or chronic inflammation, with a deposition of urate of soda in the articular cartilages. Deposits of urate of soda are also formed in the synovial membranes, the ligaments, the bursæ, the sheaths of tendons and of muscles, the cartilages of the ears, and under the skin.

The kidneys become the seat of a chronic nephritis with little or no exudation, but with a very large production of interstitial connective tissue.

Complicating lesions are of very frequent occurrence: Bronchitis, emphysema, endocarditis, endarteritis, eczema, and chronic catarrhal gastritis.

Causes.—The hereditary disposition to the disease is very marked. The gouty disposition may be acquired by the excessive use of nitrogenized food, of strong wines, and of malt liquors; by a sedentary life; by lead-poisoning; and by insufficient nourishment. The disease is especially prevalent in temperate and damp climates.

As exciting causes of attacks of gout, we recognize: Certain articles of food and drink, exposure to the weather, and injuries.

Symptoms: 1. *Of Acute Gout.*—An attack of acute gout is apt to come on during the night. There is sudden pain in one of the great-toe joints, chilliness, fever, restlessness, and sleeplessness. The next day the joint is swollen, the skin about it red, tense, and shining. The joint is extremely tender and painful. The urine is scanty, high-colored, and acid. Before and during the attack the quantity of uric acid in the urine is diminished; after the attack it is increased. Such an attack lasts for days, or weeks.

The first attack is usually, but not always, without premonition. The subsequent attacks are preceded by indigestion, constipation, flatulence, palpitation of the heart, bronchitis, irritability of temper. The urine is scanty and high-colored, or abundant and pale.

One of the great-toe joints is the joint most frequently inflamed ; next in order of frequency are the ankle, the instep, the outer side of the foot, the knee ; or several joints may be inflamed at the same time. After the inflammation has subsided the joint returns to its natural condition, or may be left a little stiff. The intensity of the inflammation of the joint varies very much in the different cases.

The height of the temperature is usually in proportion to the severity of the joint-lesion.

Instead of the regular attacks of acute gout with inflammation of the joints, there may be acute attacks with little or no joint-trouble, but with great prostration and symptoms referable to the stomach, heart, brain, or lungs.

In the stomach there is intense pain, nausea, and vomiting.

If the heart is affected there are pain, oppression, palpitation, feeble heart-action, and sometimes syncope.

The brain symptoms are severe headache and delirium.

The pulmonary symptom is spasmodic asthma.

It is possible for a person to have only one attack of acute gout, but usually the attacks are repeated, and often become more frequent as the patient grows older.

Treatment.—During the attack the patient is to be kept quiet, on a light diet, with perhaps some opium to relieve the pain. The bowels are to be moved freely every day, and considerable quantities of fluid are to be drunk. The inflamed joint must be kept quiet and free from pressure.

The most efficient drug is colchicum, the wine of the root, or the acetous extract. The dose at first is considerable, thirty minims to a drachm of the wine, one to two grains of the extract; later, these doses are diminished. The colchicum is usually combined with the salicylate of soda, or the iodide of potash. The objection to the use of colchicum is its liability to produce vomiting and diarrhœa.

To prevent the recurrence of attacks the diet must be restricted by diminishing the ingestion of sugars, starches, and alcoholic drinks. Exercise and an out-of-door life are of much service. Any disturbances of the functions of the stomach, the liver, or the bowels should be remedied as far as possible. The occasional use of the mineral waters and baths is often of much service.

2. *Chronic Gout.*—The patients suffer from acute attacks at varying intervals, but between the attacks their health is not good. The joints are constantly somewhat inflamed and become stiff and useless. Urate of soda is deposited in masses around the joints and in other parts of the body. Disturbances of digestion are troublesome and hard to relieve. The chronic nephritis, with its attendant symptoms advances from year to year. The complicating bronchitis, emphysema, endocarditis, endarteritis, eczema, or diabetes add their symptoms. The patients grow slowly worse and, if not

cut off by some intercurrent disease, finally die with the nephritis.

Treatment.—The indications for diet and treatment are the same as in acute gout. The natural mineral waters, especially those of Carlsbad, are of even greater service. The drugs most frequently used are colchicum in small doses, the iodide of potash, guaiac, the preparations of potash, soda, and lithia.

IRREGULAR GOUT.

A person is said to have irregular gout when he has the gouty diathesis and suffers from one or more of the complications of gout.

There are many morbid conditions, none of them confined to gouty persons, which may be caused in this way by the gouty disposition :

In the stomach—gastric dyspepsia and catarrhal gastritis.

In the liver—functional disturbances with nervous symptoms.

In the heart—palpitation and disturbances of sensation.

In the lungs—bronchitis.

In the eyes—iritis.

In the skin—eczema.

In the urine—an excess of urates, glycosuria, and diabetes.

In the kidneys—chronic diffuse nephritis.

In the arteries—chronic endarteritis, inflammation and rupture of the cerebral arteries.

In the joints of the fingers and toes—a gradual thickening of the ends of the bones without pain.

The treatment consists in the use of remedial measures appropriate to each one of these morbid conditions, and at the same time the general management of the gouty disposition.

ANÆMIA.

In health, while the different constituents of the blood—the red cells, the white cells, and the plasma—are constantly undergoing change, destruction, and reproduction, their relative quantities continue the same. In exactly what way, and exactly where, the death and new formation of the blood-cells take place, we do not definitely know.

In disease the blood may be changed by a diminution in the number of the red cells, a diminution in the quantity of hæmoglobin, or an increase in the number of white cells.

When the change consists in a diminution in the number of red cells and in the quantity of hæmoglobin, the patient is said to suffer from "anæmia." If such changes in the blood are well marked, we may find in addition: a variation in the form and size of the red cells, yellow spherical microcytes, and nucleated red cells.

It is evident that a diminution in the number of red cells must be due to a diminished new-formation, or an increased destruction; but to tell which of these is the efficient cause in each case of anæmia is very difficult.

While our knowledge of anæmia is still so imperfect that we cannot tell certainly the relationship of its different forms, it is necessary, for purposes of prognosis and treatment, to adopt some form of classification. For this purpose I find it convenient to class all the cases of anæmia into four groups: 1. Secondary Anæmia. 2. The Primary Anæmia of young women. 3. Pernicious Anæmia; and, 4. Anæmia apparently intermediate in character between simple and pernicious anæmia.

1. SECONDARY ANÆMIA.

Secondary anæmia is of very frequent occurrence. It is caused by Bright's disease, phthisis, malaria, cancer, uterine disease, any chronic and exhaustive disease, and hemorrhage. It also occurs, especially in women, in persons whose general health is bad, although they have no definite disease.

In these patients the pallor of the skin and mucous membranes is usually very marked. The diminution in the quantity of hæmoglobin and the number of red cells is never very great. Of the other symptoms which may be present, it is always difficult to tell how many are due to the primary disease, and how many to the anæmia.

In the treatment of these patients the essential parts are the treatment of the primary disease, and the improvement of the patient's general health by food, climate, and mode of life. Iron and oxygen are only accessory parts of the treatment, and often of little or no service.

2. THE PRIMARY ANÆMIA OF YOUNG WOMEN.

Synonym.—Chlorosis.

Causes.—The disease occurs regularly in women between the ages of fourteen and thirty years. It also occurs occasionally in young men. It is a very common disease, and is observed both in persons living in cities and those living in the country, among the rich and among the poor, in the midst of perfect health and after depressing conditions. We are ignorant of the causes of the disease, and of the causes of the changes in the blood. Whether there is an increased destruction of red cells and of hæmoglobin, or a diminished production, is uncertain.

The blood always shows a diminution in the quantity of hæmoglobin, and, usually, a decrease in the number of red cells. The loss of hæmoglobin is always marked—sixty to eighteen per cent. It is often out of proportion to the loss of red cells—thirty-eight per cent. of hæmoglobin with 4,308,000 red cells. The blood-cells are often less than 5,000,000 to the cubic millimetre, not infrequently they fall below 3,000,000.

Symptoms.—The skin and mucous membranes are usually distinctly pale, but it is possible for them to remain of their normal color. The patients remain well nourished, or may become somewhat emaciated. There is marked loss of muscular strength. The heart's action is rapid, with dyspnœa on exertion. There is often a systolic murmur diffuse over the precordial area, or with its maximum intensity at the second left intercostal space, or at the apex. Occasionally the heart is enlarged, the enlargement disappearing as the patients recover from the anæmia.

The patients may be annoyed by a cough, due to the condition of the pharynx or to hysteria. They may cough up small quantities of blood.

Very often the functions of the stomach are disturbed —gastric pain, nausea, vomiting, vomiting of blood.

In many of the patients, but not in all, the bowels are constipated.

The urine is often turbid, alkaline, and may contain small quantities of albumin without any disease of the kidneys.

The menstrual flow is usually light-colored, scanty, irregular; but is sometimes in excess.

There may be a little subcutaneous dropsy of the legs, or of the face.

In the more severe cases there is an irregular febrile movement.

The cases vary as to the rapidity with which the symptoms are developed, their severity, their number, and the predominance of one or more symptoms over others.

The patients regularly recover under proper treatment, but the symptoms are apt to recur a number of times.

Treatment.—The essential part of the treatment is the administration of iron and of oxygen. The iron is to be given in large quantities, preferably in the form of the sulphate; the oxygen is to be inhaled for ten or fifteen minutes, two or three times a day.

In addition the patient must be properly fed, the bowels must be kept open. It may be necessary for a time to keep the patient in bed, with the use of massage.

3. PERNICIOUS ANÆMIA.

Synonyms.—Idiopathic anæmia. Essential anæmia.

Lesions.—In some of the persons who have pernicious anæmia there are found after death: cancer of the stomach, chronic gastritis, degeneration or atrophy of the gastric tubules, the anchylostoma duodenale or bothriocephalus latus in the intestine, or chronic nephritis. It is believed by some that such lesions may cause pernicious anæmia; by others that their association in the same person is accidental.

As the results of the anæmia, we may also find fatty degeneration of the wall of the heart, degeneration of the hepatic cells, the renal cells, the walls of the arteries and capillaries.

In the blood the number of red cells is very much diminished. Many red cells are found of abnormal size or shape, or containing nuclei. Yellow, spherical microcytes, about one-fourth the size of the red blood-cells, are often present. The entire quantity of hæmoglobin is diminished, but not the quantity belonging to the red cells which are left in the blood. The individual red cells are still rich in hæmoglobin.

In the marrow of the long bones there are found nucleated red blood-cells, and cells enclosing old red cells.

Hunter has lately called attention to the condition of the liver. He has found in it, with pernicious anæmia, always an excess of iron. The iron is in the form of pigment granules in the liver-cells, which form the outer two-thirds of each lobule.

Nature of the Disease.—Two entirely different views are held concerning the nature of pernicious anæmia. One view is that it is simply an advanced form of anæmia, which can be produced by a variety of causes. The other that it is a primary disease, entirely distinct from other forms of anæmia.

The study of the disease made by Hunter, has led him to the following conclusions:

1. Pernicious anæmia is a special disease.
2. Its essential pathological feature is an excessive destruction of blood-cells.
3. The most constant anatomical change is the presence of an excess of iron in the liver.
4. This condition of the liver distinguishes pernicious anæmia from symptomatic anæmia.
5. The disintegration of the red cells is effected chiefly in the portal circulation, especially in the spleen and liver. The destruction is effected by poisonous agents absorbed from the intestinal tract.

Symptoms.—The disease regularly begins slowly and insidiously, much less frequently rapidly.

The color of the skin and mucous membranes becomes pale, often with a dusky or yellow tinge.

There is gradual loss of muscular and mental strength.

The functions of the stomach and intestines are disturbed.

There is palpitation of the heart, dyspnœa on exertion, attacks of syncope, a systolic murmur heard at the apex, or in the second left interspace.

There may be hemorrhages into the retina, into the skin, from the nose, mouth, bronchi, stomach, or intestines.

At some time in the course of the disease there is an irregular febrile movement.

After a time the patients lose flesh as well as strength, and the entire condition is that of very great feebleness.

The disease lasts for weeks, months, or years. The patients steadily get worse, but often with intervals of considerable improvement. The cases which run their course within a few weeks are the least frequent.

The prognosis is bad.

Treatment.—The most efficient drug in the treatment of the disease is arsenic, which must be given in considerable doses. Iron, oxygen, feeding, and nursing are accessory measures.

4. ANÆMIA WHICH CLINICALLY HOLDS AN INTERMEDIATE PLACE BETWEEN SIMPLE ANÆMIA AND PERNICIOUS ANÆMIA.

I describe a group of cases under this name merely as a matter of temporary convenience, not with the idea that they represent a distinct disease.

This form of anæmia is observed both in men and women, some of them over fifty years of age. No cause can be discovered for its development.

The blood shows. a fairly marked diminution of red cells and hæmoglobin, but not as marked as in pernicious anæmia.

The symptoms are the same .as those of simple anæmia.

The patients improve a good deal under treatment, but yet do not seem to get entirely well.

Arsenic apparently does them no good. Iron and oxygen are of some use. But the most important part of the treatment is the attention to the diet, exercise, and mode of life.

ADDISON'S DISEASE.

Definition.—A disease characterized by anæmia, general languor and debility, feeble heart-action, irritability of the stomach, a peculiar change in the color of the skin, and disease of the supra-renal capsules (Addison).

Later authors have included with the disease cases of diseased supra-renal capsules and anæmia, without pigmentation of the skin; and cases of pigmented skin and anæmia, without disease of the supra-renal capsules.

Lesions.—The regular change in the supra-renal capsules is a tubercular inflammation, which results in the conversion of the capsules into masses of fibrous tissue and cheesy matter.

Less frequently the capsules have been found atrophied, or absent.

The change in the skin consists in a deposition of pigment in the deeper epithelial cells and in the connective-tissue cells of the cutis.

The spleen is sometimes enlarged.

In the abdominal sympathetic there have been found an increase of fibrous tissue and a degeneration of the nerve-fibres and cells.

In the blood there is a diminution of the number of red cells and the quantity of hæmoglobin.

Nature of the Disease.—While we are still very ignorant of the nature of the disease, there is a general impression that the disease of the supra-renal capsules is to be looked on as a causative lesion.

G. Tizzoni (1889) has published the results obtained from a long series of experiments on animals. He concludes:

1. In rabbits the destruction of one or both supra-renal capsules causes death.

2. Death takes place after a few hours, or many months.

3. Before death, especially in the longer-lived rabbits, symptoms are developed like those of Addison's disease—pigmentation of the skin, emaciation, loss of strength, stupor, convulsions.

4. After death lesions are found in the cerebrum, cerebellum, cord, and peripheral nerves. In the cerebrum and cerebellum the changes are diffuse. In the cord they are most marked in the lower cervical and upper dorsal region. They begin in the central canal and extend through the gray and white commissures to the anterior and posterior horns.

The lesion is a degeneration of the nerve-fibres, and ganglion-cells, with congestion, hemorrhages, and infiltration, with leucocytes.

Causes.—The disease has been observed in persons between the ages of eleven and fifty-eight years. It is more common in males than in females. We know nothing concerning its causation.

Symptoms.—There is a gradual loss of muscular strength. The mind becomes dull, apathetic, listless; the temper is often irritable and peevish. The heart's action is feeble and rapid, with dyspnœa on exertion and liability to attacks of dyspnœa. The functions of the stomach are often disturbed, with pain, nausea, and vomiting. There may be irregular pains in the loins, epigastric and hypochondriac regions.

As the disease goes on, the mind becomes more feeble, and the patients less able to take care of themselves. They may suffer from vertigo, from feelings of numbness in different parts of the body, or portions of the skin may be anæsthetic.

As the anæmia is developed, the skin and mucous membranes become pale.

The characteristic brownish discoloration appears in those parts of the skin which are usually uncovered by clothing, and in the region where the skin is naturally darker. The mucous membrane of the lips, gums, and tongue may be discolored in the same way.

In the last stages of the disease, the patients are exceedingly feeble; stupor, delirium, general convulsions, or coma, may be developed.

The patients die from asthenia, in an attack of syncope, or in convulsions.

The disease is protracted for months or years, with periods of remission and of exacerbation, but the patients always finally become worse.

Rarely, the constitutional symptoms are very slight until a few days before death.

The discoloration of the skin may exist for months, or years, before any of the other symptoms. Or the general symptoms may last for a long time before any discoloration of the skin is established.

The *Treatment* of Addison's disease is directed entirely to the alleviation of symptoms and the comfort of the patient. For the disease itself no treatment is known.

LEUKÆMIA.

This is a disease characterized by diminution in the number of red blood-cells and the quantity of hæmoglobin, increase in the number of white blood-cells, enlargement of the spleen, lymphatic glands, and marrow of the bones.

Lesions.—The specific gravity of the blood is lowered. Its color is light-red or even whitish, looking like pus and blood mixed. The number of the red cells is diminished. The white blood-cells are very much increased in number; the increase in the number of the larger white cells is especially marked in the cases in which the spleen is enlarged.

The marrow of the bones is hypertrophied, of yellow or red color, with an increased growth of both the cells and stroma.

The spleen is in most cases much enlarged, this enlargement being a simple hypertrophy.

The lymphatic glands are often hypertrophied, or tumors composed of lymphatic glandular tissue are formed in the liver, kidneys, lungs, stomach, intestines, or peritoneum.

There may be extravasations of blood in any part of the body. There may be an inflammation of the retina resembling that which complicates Bright's disease.

There may be fatty degeneration of the walls of the heart.

Causes.—The disease has been observed in persons between the ages of eight weeks and seventy years. It occurs most frequently between the ages of thirty and forty years. It is more frequent in man than in woman.

In some patients the disease seems to be secondary to malarial poisoning, to syphilis, to blows on the spleen, or to starvation.

Symptoms.—The cases with hypertrophy of the spleen, the lymphatic glands, and the marrow are the most common. Next in frequency are those with hypertrophy of the spleen and marrow; next, those with hypertrophy of the lymphatic glands and marrow; while the least frequent are those with hypertrophy of the marrow alone.

The symptoms due to the changes in the blood are present in all the cases.

The symptoms begin and go on slowly and gradually; either the change in the patient's general condition, or the enlargement of the spleen or glands, may first attract attention.

The change in the color of the skin and mucous membranes is usually well marked, the patient becoming extremely white. Occasionally, however, the color remains natural for a long time.

There is a gradual loss first of strength, and then of flesh. The mental faculties may remain for a long time unimpaired, or they may become dull and sluggish, with peevishness and irritability of temper.

The eyesight may be impaired by the complicating retinitis.

The heart's action becomes feeble, irritable, with a systolic murmur, dyspnœa, and liability to attacks of syncope.

There may be pain after eating, nausea, and vomiting. Menstruation is scanty and irregular. There may be a moderate amount of subcutaneous dropsy.

The temperature remains normal, or from time to time there is an irregular febrile movement.

Hemorrhages are common—from the nose, gums, bronchi, stomach, intestines, uterus, bladder. The largest bleedings are those behind the peritoneum, which may cause death within a short time.

The enlargement of the spleen, glands, and liver is easily recognized.

The disease regularly lasts for months or years, with periods of exacerbation and of improvement.

The *Prognosis* is bad, but a few cases of cure have been reported.

Treatment.—The drugs most frequently employed are arsenic, phosphorus, and iron. The hypertrophy of the spleen has been treated by electricity, interstitial injections, and extirpation.

PSEUDO-LEUKÆMIA.

Synonyms.—Anæmia lymphatica. Hodgkin's disease.

A disease characterized by a progressive decrease in the number of red blood-cells, an enlargement of the lymphatic glands, and new-growths of lymphatic glandular tissue.

Lesions.—The changes in the blood consist simply in a diminution in the number of red blood-cells, without any increase in the number of white cells.

Of the lymphatic glands, one or more groups are enlarged, in the following order of frequency: the cervical glands, the axillary, the inguinal, the retro-peritoneal, the bronchial, the mediastinal, and the mesenteric. Of these groups of glands those on one or on both sides of the body may be involved. The enlargement of the glands is a simple hypertrophy, with an excess either of the stroma, or of the cells.

The new-growths of lymphatic glandular tissue are found in the spleen, the liver, the œsophagus, the stomach, the intestines, the peritoneum, the kidneys, the lungs, the pleura, the ovaries, the testicles, the dura mater, and the skin.

The marrow of the bones is changed in the same way as in leukæmia.

Causes.—The disease is more frequent in males than in females, in the proportion of three to one. It has been observed in persons between the ages of one and seventy years, but it is most frequent in early and late adult life.

Symptoms.—Both the changes in the glands, the new-growths of glandular tissue, and the changes in the blood contribute to the symptoms.

The enlarged cervical glands may press on the pharynx, the larynx, the carotids, and the veins of the neck.

The enlarged intra-thoracic glands may press on the trachea, the œsophagus, the bronchi, and the descending vena cava.

The enlarged glands in the abdomen may cause pain, they may press on the common bile-duct, or the portal vein.

The enlarged glands in the pelvic and iliac regions may cause pain in the thigh or along the track of the sciatic nerve, and œdema of the leg.

The new-growths in the liver and spleen are accompanied with the enlargement of these organs.

The changes in the blood produce symptoms like those of pernicious anæmia.

Feeble heart-action with dyspnœa on exertion ; bodily and mental weakness ; dropsy ; hemorrhages ; nervous and hysterical symptoms ; an irregular febrile movement ; pain and tenderness over the bones. Some of the patients, toward the close of the disease, develop delirium, general convulsions, or coma.

The disease begins either with the symptoms belonging to the anæmia, or with those belonging to the glands. The patients slowly get worse, both sets of symptoms becoming more and more marked, but yet one usually predominating.

The patients finally die worn out, feeble, and emaciated ; or from the pressure of the enlarged glands on the blood-vessels or air-passages ; or with cerebral symptoms ; or from some intercurrent disease.

Treatment.—The most efficient methods of treatment seem to be the removal of the enlarged glands by operation, and the internal administration of arsenic or of iodine in considerable doses.

THE INFECTIOUS DISEASES.

THIS name is given to a number of diseases which all have this in common, that they are produced by poisons introduced into the body from without.

These poisons have been demonstrated for some of these diseases, but not for all. It is not yet certain whether each disease has its peculiar poison, or whether the same poison, under different conditions, may produce different diseases. Except in the case of the malarial diseases, the poisons which have been demonstrated are micro-organisms belonging to the class of bacteria.

It is probable that, in some at least of these diseases, the actual poisoning is effected, not by the bacteria, but by the ptomaïnes formed during their growth.

We are still very ignorant of the exact way in which these micro-organisms produce disease, and of the reasons why they produce disease in some persons and not in others.

It has been customary to distinguish two groups of infectious diseases, under the names of "Miasmatic" and "Contagious." With the progress of our knowledge, however, these names are becoming less useful than formerly.

The *Miasmatic Diseases* are said to be those infectious diseases in which the micro-organisms naturally live without the body, in the soil or water, are accidentally introduced into the human body, but are not eliminated from the body in a condition capable of producing infection.

The *Contagious Diseases* are said to be those infectious diseases in which the micro-organisms naturally live and multiply within the body, although they may also continue to live without it. They multiply within the body, and are eliminated from it in a form capable of producing infection. They may be inoculated through an abraded surface, inhaled into the air-passages, or swallowed into the alimentary canal.

The micro-organisms are regularly found, most constantly and in the largest numbers, in the characteristic local lesions which form a part of most of the infectious diseases.

It is found that while some persons are susceptible to the poisons of the infectious diseases, that other persons enjoy an immunity from the action of these poisons. It is also found that in some of these diseases, one attack protects against subsequent attacks of the same disease.

Temporary conditions of atmosphere, water, soil, and uncleanliness favor the development of these diseases.

Some of the infectious diseases only occur from time to time, in the form of epidemics.

THE INFECTIOUS INFLAMMATIONS.

There are inflammations of different parts of the body, which occur independently of the infectious diseases, but are due to the introduction into a particular part of the body of pathogenic micro-organisms.

Such infectious inflammations are seen as abscesses, as gonorrhœa, as localized tubercular inflammation, etc.

EPIDEMIC CEREBRO-SPINAL MENINGITIS.

An infectious disease of which the characteristic lesion is an inflammation of the pia mater of the brain and of the spinal cord.

Lesions.—The pia mater of the brain and of the cord is infiltrated with serum, fibrine, and pus in varying quantities. Sometimes there is a layer of fibrine and pus on the inner surface of the dura mater. The ventricles contain purulent serum. In children as a rule, and in adults occasionally, the lateral ventricles are dilated and distended with purulent serum.

The quantity of pus and fibrine in the pia mater may be so small that it can only be seen with the microscope.

In some cases the meningitis is of the cellular variety, with no serum, fibrine, or pus.

It is said that in the very rapid cases there is only congestion of the pia mater.

As regards the characteristic micro-organisms of the disease, Weichselbaum has described in six cases a special form of diplococcus.

Causes.—The disease is one which has appeared in the form of epidemics. But occasional cases are seen between the epidemics. Most of the epidemics have occurred in the winter and spring. Children and young adults are peculiarly liable to the disease. Apparently, the disease is not transmitted from person to person, but is due to the introduction of a poison from without into a number of persons at the same time.

The epidemics have occurred at the following times:

In 1805, in Geneva, Switzerland.

In 1806, in Massachusetts.

In 1837 to 1850, in many different countries.

In 1854 to 1861, in Sweden.

In 1856 to 1857, in the United States.

In 1863 to 1865, in Northern Germany.

In 1861 to 1872, in the United States.

In 1872 to 1873, in New York City.

Symptoms. 1. *Of the Malignant Form.*—The invasion of the disease is very sudden, its course rapid, and its termination fatal. Chills, a rise of temperature, prostration, loss of consciousness, and death succeed each other so rapidly that the time between invasion and death is only a few hours.

2. *The Ordinary Form.*—A prodromic period, lasting for a few hours up to as long as seven days, is present in some epidemics, absent in others. During the prodromic period the patients complain of general malaise, headache, pains in the bones, loss of appetite, chilliness, and a slight rise of temperature.

When the invasion is sudden, it is marked by one or more of the following symptoms:

Chills—severe or slight.

A febrile movement, of which the height regularly corresponds to the severity of the disease.

Headache—usually frontal, sometimes occipital, sometimes general.

Vomiting—either occasional, or frequent.

Tenderness and contraction of the muscles of the back of the neck.

Irregular pains in different parts of the body.

Conjunctivitis.

Restlessness, sleeplessness, or delirium.

Prostration.

After the disease is fairly established the following are the regular symptoms :

Headache—usually frontal, sometimes occipital or general; regularly severe and constant, occasionally mild or with intermissions.

Restlessness, sleeplessness, delirium, and stupor are present in various degrees, either early or late in the disease, or throughout its entire course. The delirium is mild, or active, or so violent as to resemble acute mania. The establishment of well-marked delirium and stupor alternating with each other, one or the other predominating as the disease goes on, belongs to the severe cases.

The intelligence may continue fairly good for some time, or is lost early in the disease.

General convulsions are observed in children, not often in adults.

Involuntary contractions of the muscles of the face are not uncommon.

Vomiting is a very common symptom at the beginning of the disease, and may at this time be the most prominent symptom.

The bowels are usually constipated, but during the later stages of the disease there may be diarrhœa and involuntary evacuations.

Pain, tenderness and contraction of the muscles of the back of the neck, or also of the muscles along the vertebral column, are often present.

There may be hyperæsthesia of the skin.

The hearing is at first unnaturally acute and painful, later it is dulled or entirely lost.

The eyes are liable to a variety of inflammations—conjunctivitis, keratitis, or choroiditis. Independently of inflammation, there is at first photophobia, later indifference to light. When the disease is fairly established there may be internal strabismus.

Eruptions of the skin are present in some epidemics, absent in others. They take the forms of erythema, roseola, or petechiæ.

The tongue is at first moist and coated, later dry and cracked.

The characteristic pulse of the disease is one which is slow in proportion to the temperature until the later stages of the disease. But exceptions to this rule are not uncommon.

There is a distinct febrile movement throughout the disease, but one which often runs a very irregular course, rising and falling without much reference to the other symptoms.

The ordinary duration of the disease is from seven to twenty-one days, but some cases last even longer than this.

During the past few years I have seen in New York cases of cerebro-spinal meningitis which have run an atypical course.

The symptoms have come on gradually, some of the patients not in bed until after several days, none of them looking very sick for the first one or two weeks.

In some of the patients the first symptom has been a headache like that of malaria, or of syphilis.

In others, besides the headache, there have also been loss of appetite, vomiting, photophobia, drowsiness, sleeplessness, tenderness over the back of the neck, or an eruption like that of typhoid.

In still others there has been no headache, only prostration, sleeplessness, and a little fever.

For one or two weeks, or even longer, the patients do not look very sick. They make you think of malaria, or syphilis, or a mild typhoid. But they do not get any better, they lose flesh and strength, develop alternating stupor and delirium, and finally die after from four to eight weeks.

The temperature is seldom over 102°, often down to 99° or even 97°. .

The pulse is between 70 and 120. After death, in most of the patients the lesions found have been those of cellular meningitis, but in one case there was a large exudation of fibrine and pus at the base of the brain.

In children the invasion of the disease is often marked by convulsions, which may afterward be frequently repeated. The temperature is high and the pulse rapid throughout the disease. During most of the time the children are in a condition of stupor alternating with restlessness.

In the regular cases there may be a temporary cessation of the symptoms for several hours, or even for two or three days, and then they go on as before.

The disease may be complicated by bronchitis, pneumonia, pleurisy, pericarditis, or endocarditis.

Sequelæ.—After the subsidence of the meningitis the inflammation of the lateral ventricles may continue.

The patients begin to improve, but soon fall back. There is progressive emaciation, an irregular febrile movement, alternating stupor and delirium, and after several weeks the patients die.

Other sequelæ are: blindness, deafness, mental feebleness, aphasia, anæmia, hysterical symptoms, disordered menstruation, paralyses of groups of muscles, and chronic endocarditis.

The Prognosis of the disease varies in different epidemics, regularly worse during the commencement and height of each epidemic.

Treatment.—There are two main indications for treatment—the meningitis, and the general condition of the patient.

For the meningitis we abstract blood from the temples and the nape of the neck, apply continuous cold to the head, and administer repeated small doses of calomel or the sulphate of magnesia. The iodide of potash and ergot are also used for the same purpose. These measures are most likely to be efficacious during the early days of the meningitis.

For the headache, restlessness, sleeplessness, and delirium, we give the bromides, chloral hydrate, or opium.

The temperature is seldom so high as to need any attention.

The heart's action may be so feeble as to require the use of alcoholic stimulants, digitalis, or strophanthus.

Excessive vomiting can be relieved by feeding the patients with small quantities of milk to which oxalate of cerium, bicarbonate of soda, or sulphonal have been added.

The bowels should be kept open.

If it is sudden the patients at once become seriously ill with rapid development of all the symptoms of the disease.

When the disease is established, there is frequent vomiting, first of food, then of brownish fluid, coffee-ground matter and blood. There is diarrhœa with clay-colored fæces and later bleeding from the intestines. Jaundice in two-thirds of the cases appears early in the disease, in one-fourth of the cases from the fifth to the seventh day, in a few cases not until one or two days before death, in very rapid cases there may be no jaundice. There may be pain over the region of the liver. There is a febrile movement during the active period of the disease, but the temperature runs an irregular course, sometimes very high, sometimes falling below the normal. The pulse becomes rapid and feeble.

There are cerebral symptoms—headache, alternating stupor and delirium, general convulsions, and coma.

The tongue becomes brown and dry; the prostration is very marked.

The liver [illegible] at first be enlarged and then become [illegible] or may be diminished from the outset. The diminution in size, as we mark it out by percussion, is very rapid, until the liver dulness may entirely disappear. In some cases, however, the liver remains throughout the disease of nearly its normal size.

The urine contains bile-pigment, albumen, casts, blood, leucin, and tyrosin. The urea and uric acid are diminished in quantity.

There are often hæmorrhages from the stomach, intestines, and kidneys, and in the skin.

The ordinary duration of the active symptoms is a week, but a prolonged period of invasion may lengthen the whole time of the disease to four weeks, and the malignant cases may die within twelve hours.

The Prognosis of the disease is very bad.

CIRRHOSIS OF THE LIVER.

Lesions.—Cirrhosis of the liver is a chronic interstitial hepatitis with a production of new connective tissue. This new tissue follows the distribution of the stroma of the liver. It surrounds large or small groups of acini, or single acini, or grows diffusely between the liver-cells, or is in the form of large bands and masses. Accordingly the liver is coarsely or finely nodular, or smooth, or lobulated. The liver-cells may become atrophied or fatty. The small veins and bile-ducts are often obliterated. The larger bile-ducts may be the seat of catarrhal inflammation. The liver may remain of its normal size, or it may become small, or large.

The obstruction to the passage of the blood from the portal vein through the liver causes the spleen to become large and hard, the mucous membrane of the stomach [illegible]d and coated with mucus, the peritoneum [illegible]ain serum.

Causes.—The disease belongs to adult life and is usually caused by alcohol, or syphilis. It is, however, occasionally seen in children and may occur without discoverable cause.

The Symptoms depend on :

1. The disturbance in the bile-producing function of

the liver, with the consequent digestive disturbances and loss of nutrition.

2. Upon the interference with the passage of the portal blood through the liver, with the consequent dropsy and inflammation of the stomach and intestines.

Physical Signs.—These depend on the changes in the size of the liver and the spleen, and the presence of fluid in the abdominal cavity.

Complications.—Persons who have cirrhosis of the liver are very apt to have at the same time pulmonary emphysema, chronic nephritis, or chronic endarteritis.

Course of the Disease.—This varies according to the early or late development of the symptoms; the predominance of the symptoms due to the disturbance of the bile-producing function of the liver and those due to the obstruction of the portal circulation; the rapid or slow progress of the disease, and the intermissions or cessation of the chronic inflammatory process.

During the early stages of cirrhosis the principal symptoms are those due to the disturbance of the bile-producing function of the liver and the accompanying [illegible] these to be the only symptoms throughout the disease.

In other cases the dropsy will be the first symptom, and the nutrition of the patient will be fairly good.

In some cases the vomiting of blood in small or large quantities will be the principal symptom.

In some cases the symptoms belonging to the accompanying chronic gastritis will be more marked than those of the cirrhosis.

In the larger number of cases all the symptoms are developed: anæmia, loss of flesh and strength, dropsy, gastric dyspepsia, and constipation.

In a few cases, after the disease has lasted for some time, there is developed a very fatal form of jaundice, especially with the large cirrhotic livers.

The patients have pain over the liver, vomiting, constipation, a constantly increasing jaundice, a febrile movement, gradual emaciation, and cerebral symptoms. These cases are not to be confounded with those of acute gastro-duodenitis complicating cirrhosis.

The Prognosis of cirrhosis is unfavorable, but yet in many cases the course of the disease is slow, and in some it is arrested altogether.

Treatment.—This is most efficacious during the early stages of the disease. The use of tobacco and alcohol are to be prohibited. Constitutional syphilis, if it exists, must be treated. The patients should lead, as far as possible, an out-of-door life. The disturbance of the bile-producing function of the liver is to be treated according to the plans already given. The gastritis is to be attended to. The dropsy is to be relieved by diuretics, cathartics, diaphoretics, and tapping the peritoneal cavity. For the hæmatemesis we use nitrate of silver and ergot.

ABSCESS OF THE LIVER.

Abscesses of the liver are produced by suppurative inflammation of the walls of the bile-ducts, or of the veins, extending to the liver-tissue; by infectious emboli in cases of pyæmia, and they occur as a primary suppurative inflammation of the liver.

IDIOPATHIC OR TROPICAL ABSCESS OF THE LIVER.

Lesions.—There is a single abscess of some size, or two, three, or four abscesses of the same character. The abscesses follow one of three anatomical forms:

1. They resemble ordinary abscesses in any part of the body. There is a cavity in the liver filled with well-formed pus, the walls of this cavity are infiltrated with pus. This is the least fatal form of abscess.

2. There is a cavity in the liver with ragged, irregular, necrotic walls, and containing a thin reddish or brownish fluid, with fragments of dead liver-tissue.

3. A considerable area of liver-tissue is dead, with little cavities filled with pus scattered through it. This is the most fatal form of abscess.

The abscesses may be situated in any part of the liver. If they are situated near the surface of the liver there will be inflammation, and the formation of adhesions to the surrounding parts. If left to themselves the abscesses usually increase in [illegible] til they perforate t [illegible] he pleura, or the pericardium; or into the stomach, the intestines, the peritoneal cavity, or the pelvis of the right kidney; or through the anterior abdominal wall.

Causes.—In rare cases there is a history of a blow inflicted over the liver, more frequently there is no exciting cause. The disease is much more common in tropical climates than in temperate ones. It seems probable that some of the abscesses are secondary to dysentery, and that others are due to the same pathogenic bacteria which produce dysentery, although no dysentery exists.

Symptoms.—1. As it is observed in tropical countries. The invasion is, or is not, preceded by the symptoms of dysentery. It is acute, ushered in by chills and a febrile movement, and marked prostration.

The chills may be repeated throughout the disease. The fever is of the continuous, remittent, or intermittent type, and is accompanied by sweating. There are pains and tenderness over the liver.

Jaundice is not a constant or marked symptom.

Nausea and vomiting are often present.

There may be localized or general peritonitis. There may be ascites without peritonitis.

Perforation of the abscesses is followed by symptoms according to its position.

2. As it is observed in New York. The invasion is gradual. The patients feel chilly and feverish, lose their appetites, may have nausea and vomiting, feel sick, but often do not go to bed for several days. After they get to bed the fever continues, with chills and sweating. The nausea and vomiting continue, [illegible] re pains and tender- [illegible] does not take place these symptoms continue for weeks, months, or years.

Physical Signs.—At first there is a general enlargement of the liver, later a localized enlargement, according to the presence of the abscess. This may project downward into the peritoneal cavity, or upward into the pleura.

Diagnosis.—As the disease is seen in New York, it resembles, except for its local symptoms, typhoid fever.

Treatment.—During the early stages of the inflammation we may try to control it by the local application of leeches, followed by poultices, or by continuous cold; and by the internal administration of ipecac, or the chloride of ammonium, in large doses.

After the abscess is fully formed, its contents must be evacuated by the aspirator or by a free incision, according to its position.

THE FATTY LIVER.

Lesions.—There is a deposit of fat in the liver-cells, and the liver is increased in size. There are no changes in the stroma or blood-vessels. The larger bile-ducts may become the seat of acute or chronic catarrhal inflammation.

Causes.—The disease occurs at all ages; it is more common in females than in males. Intemperance, over-eating, indolence, and phthisis seem to act as causes.

Symptoms.—1. Many fatty livers give no symptoms at all.

2. With some fatty livers there are marked symptoms of derangement of the bile-producing functions of the liver, with the physical signs of a large liver. The patients are fat, but anæmic and feeble. Mental lassitude and depression, and abnormal sensations in different parts of the body are prominent symptoms. The bowels are constipated, and the functions of the stomach are deranged. There is often added a chronic gastritis, sometimes with the vomiting of blood.

The Treatment of these cases is the same as that of the derangement of the bile-producing function of the liver.

3. The changes in the liver-cells may be exceptionally extensive, and the increase in the size of the liver enormous. In these patients the first symptoms are those of the disturbance of the bile-producing function of the liver, and of chronic gastritis. These symptoms do not improve, but get worse. The patients become so feeble and anæmic that they are confined to bed. They become slightly jaundiced. They finally die in a condition of extreme exhaustion.

4. Patients with fatty livers and chronic gastritis are particularly liable to attacks of acute gastro-duodenitis with jaundice. These attacks are always severe and often fatal.

5. Patients with fatty livers are liable to the same curious and fatal form of jaundice which occurs with cirrhosis. There is a constantly increasing jaundice with its attendant symptoms and death. No obstruction is found in the bile-ducts.

RTAL VEIN.

Lesions.—The main trunk of the portal vein, or one or more of its branches, is partly or completely filled by a thrombus. This thrombus does not soften, but is replaced by new connective tissue.

Causes.—Cirrhosis or cancer of the liver, chronic peritonitis, tumors of the abdominal cavity, and injuries inflicted over the upper part of the abdomen act as

Treatment.—The treatment of the throat is effected by local applications made with the brush, spray, syringe, vapor, or gargle. Some of the local applications are used in order to dissolve the false membrane—steam, lime-water, glycerine, lactic acid, pepsine, trypsine.

Some are used as germicides : bichloride of mercury, carbolic acid, salicylate of soda, bromine, iodoform, boracic acid. Some are used to diminish the inflammation : alum, borax, nitrate of silver, the salts of iron, iodoform, boracic acid.

The laryngitis cannot be successfully treated by local applications. If the interference with breathing is at all marked, it should be relieved by intubation or tracheotomy. Neither of these procedures is of any use except to relieve the laryngeal dyspnœa ; they do not lessen the liability to inflammation of the trachea and bronchi.

In the general treatment of the disease one of four plans is usually followed:

1. Nothing is done except the nursing, feeding, and relief of symptoms.

2. The patient is given from five to twenty minims of the tincture of the chloride of iron every two hours, and from three to five grains of the chlorate of potash every two hours, these medicines being given alternately.

3. Whiskey or brandy is given in considerable quantities and at regular intervals, not as cardiac stimulant, but to keep the patient partly under its influence.

4. The bichloride of mercury is given in doses of from $\frac{1}{100}$ to $\frac{1}{50}$ of a grain every two hours.

During convalescence it is often necessary to use means to improve the patient's general health, and to hasten the disappearance of the paralyses.

EPIDEMIC INFLUENZA.

Synonyms.—Epidemic Catarrhal Fever. Grippe.

Definition.—An infectious disease, occurring in epidemics, characterized by prostration, fever, pains, and catarrh of the mucous membranes.

History and Causes (Ziemssen).—The history of influenza can be traced back with certainty only to the beginning of the sixteenth century. With the year 1570 begins a series of epidemics the wide distribution of which has been reached by no other acute infectious disease. Up to the year 1870, more than ninety epidemics have been described, which generally extended over whole countries, or whole quarters of the earth. As a rule, the epidemics advance from the east and northeast toward the west. Sometimes they occur simultaneously at several different parts of the earth. The epidemics lasted, as a rule, only four to six weeks; only exceptionally, as in Paris in 1831, have they lasted for nine or ten months. Wherever the epidemics prevail very large numbers of the population are attacked. There is no special liability or immunity by reason of age, sex, constitution, or condition of life; but in some epidemics children are exempt. The influenza, as such, is not usually fatal, but while it prevails the general death-rate is increased. Climate and atmospheric influences seem to exert no effect. One attack of the disease does not protect against subsequent attacks. The disease is not contagious. Its specific micro-organism has not as yet been demonstrated.

Lesions.—There are catarrhal inflammations of the mucous membranes of the eyes, nose, ear, throat, larynx, bronchi, stomach, or intestines. The severity of these inflammations varies in different persons and in different epidemics; those of the bronchi are the most intense.

Lobar pneumonia, broncho-pneumonia, pleurisy, and empyema are developed as complicating lesions.

Symptoms.—The invasion of the disease is usually sudden.

Chills are mild, severe, or absent. A febrile movement is regularly present, but not very high.

Headache is often present, a frontal pain dependent on inflammation of the frontal sinuses, or a general headache. These headaches are often very severe, they last for hours or days.

There are often pains in different parts of the body. Mental and bodily prostration are quite marked symptoms.

The tongue is coated; there may be vomiting, or diarrhœa. There may be catarrhal inflammation of the conjunctiva, nose, pharynx, tonsils, or larynx. The bronchitis may be mild or severe. The complicating pneumonia and pleurisy give their characteristic symptoms.

The ordinary duration of the disease is from three to five days.

The prognosis is good, except in the cases complicated by severe bronchitis or pneumonia.

Course of the Disease in New York in 1889–1890.—The ordinary cases were marked by a sudden invasion, with or without a chill. The temperature ranged between 100 and 103. Headache, pains in the back and limbs, and prostration were fairly marked, while the catarrhal symptoms were not prominent. The patients were sick for from two to five days.

As exceptions to this ordinary course of the disease, there were observed:

Cases preceded by a prodromic period.

Cases with relapses.

Cases protracted for two or three weeks.

Cases followed by an unusual development of mental and bodily depression.

Cases with an excessive development of the chill, fever, headache, pains, vomiting, diarrhœa, or prostration.

The bronchitis was of mild type, or of severe type with profuse expectoration of mucus and blood, or localized in some part of one lung. It was developed during or after the influenza.

The pneumonia in children followed the type of broncho-pneumonia, in adults that of lobar pneumonia with an excessive catarrhal bronchitis.

In adults the pneumonia involved one or more lobes, with incomplete or complete hepatization. In all the cases there was marked general catarrhal bronchitis. The pneumonia was developed during or after the influenza.

The invasion was in many cases like that of an ordinary lobar pneumonia, in other cases not as well marked.

The physical signs were those of the bronchitis and the consolidation, varying with the extent of the consolidation.

The expectoration was usually very profuse, more like that of bronchitis than that of pneumonia.

The course of the temperature was not like that of ordinary pneumonia. There was no well-marked defervescence, and the fever sometimes continued after resolution had taken place.

There was often marked failure of the heart's action.

The pneumonias were of unusually long duration, with very slow resolution.

The cases were of all kinds—mild, severe, and protracted.

Some of the worst cases were those in which the pneumonia was developed in persons already suffering from chronic phthisis.

In some cases the pneumonia was followed by empyema.

Treatment.—For the influenza as such there is no treatment.

The headache, if dependent on inflammation of the frontal sinuses, can be relieved in some cases by local applications to the nose. For the general headache, phenacetine, antifebrine, antipyrine, morphine, and the bromides are used. The same drugs are employed for the relief of pains in other parts of the body.

For the vomiting, cocaine, sulfonal mixed with the milk, and small doses of morphine, are of service.

The diarrhœa and pain are controlled by opium.

The bronchitis is treated by counter-irritation, or cupping over the chest, and by the internal administration of opium, ipecac, belladonna, and quinine in small doses.

With the pneumonia and the bronchitis, the heart failure constitutes the principal indication for treatment.

ASIATIC CHOLERA.

An infectious disease characterized by vomiting, purging, cramps, and collapse.

Causes and History.—The natural home of the disease is in India, where it has been endemic for an unknown length of time.

The first epidemic of cholera was between the years 1817 and 1823. The disease prevailed all over India, and extended to Ceylon, Burmah, Siam, Japan, China, Arabia, Persia, and Syria.

The second epidemic was between the years 1826 and 1837. It spread through the same countries as in the first epidemic, and extended into Egypt, Russia, Germany, Austria, England, France, Belgium, the Netherlands, Canada, the United States, Mexico, Central America, Portugal, Spain, and Italy.

The third epidemic was from 1846 to 1863, and extended over the same countries as were involved in the second epidemic.

The fourth epidemic, from 1863 to 1875, advanced rapidly into Europe, and was very extensive. In New York the disease prevailed in 1866 to 1867. In the valley of the Mississippi River there was an epidemic in 1873.

The fifth epidemic began in 1883, and is not yet finished. It has as yet not gone over as many countries as did its predecessors.

The disease apparently originates only in India, and does not occur in other countries unless imported into them.

When the disease has been imported into any country it is not likely to spread, unless it finds there conditions favorable to its development. These favorable conditions are: the uncleanly habits of the population, and conditions likely to produce diarrhœa.

The pathogenic micro-organism of the disease was described by Koch in 1884. It is called the "Spirillum choleræ asiaticæ," or popularly the "Comma Bacillus."

The micro-organism grows and multiplies rapidly within the intestines, and acts there as a local irritant. It is discharged with the fæces, rarely with the vomit. It is not present in the urine, the breath, or the sputa, it is not given off from the surface of the body. Outside of the human body the organisms live, grow, and multiply on moist surfaces and in dirty water.

They are destroyed by drying, heat, boiling, mineral acids, corrosive sublimate, and carbolic acid.

To communicate the disease, the organisms discharged in the fæces of the sick must be taken into the alimentary canals of the healthy.

Lesions.—1. Those who die during the stages of invasion or collapse.

The temperature of the body may rise after death. The rigor mortis begins early and lasts for a long time. The skin is of a dusky gray color; the lips, eyelids, fingers, and toes are livid; the cheeks are fallen in; the skin of the fingers is shrunken and wrinkled.

The sinuses of the dura mater are filled with thick blood. The pia mater may be œdematous, or ecchymotic, or infiltrated with fibrine.

The pleura may be coated with fibrine. The lungs are shrunken and anæmic.

The peritoneum may be coated with fibrine.

The stomach may show the lesions of catarrhal gastritis.

The small intestines are anæmic, or congested, the solitary and agminated glands may be swollen; the mucous membrane is soft.

The colon is, in some epidemics, the seat of croupous inflammation.

The kidneys show the lesions of acute degeneration.

2. Those who die during the stage of reaction. The bodies do not present the same appearance of desiccation, and more inflammatory changes are found.

The larynx, bronchi, lungs, pleura, stomach, or intestines may be inflamed.

Symptoms.—In the first stage of cholera the disease follows one of two forms:

1. The patients are suddenly attacked with pains in the abdomen, purging, vomiting, and cramps. These symptoms last for half an hour, or several hours. Then the patients either die or go on to the second stage of the disease.

2. The patients have an ordinary, moderate diarrhœa, with loss of appetite, nausea, and prostration. These symptoms continue for several days. Then the patients recover, or go on to the second stage of the disease.

In the second stage of the disease there are frequent, large passages of fluid looking like rice-water, from the bowels. There is vomiting of food, of drink, and of a rice-water fluid like that which is passed from the intestines. The patients suffer from constant thirst, from pains in the abdomen, and from painful cramps in the muscles of the legs. The temperature falls below the normal, the pulse is rapid and feeble, the face is shrunken and pinched, the urine is scanty. The second stage lasts for from two to fifteen hours, then the patients may get better, or they may pass into the third stage of the disease.

In the third stage of the disease, the stage of collapse, the vomiting and purging continue, but are not as frequent. The cramps and pains also continue. The heart's action is so feeble and rapid that the radial pulse cannot be felt. The shrunken and livid appearance of the skin and face is more marked; the prostration is extreme; the urine is suppressed; the temperature falls to about 94°; the patients are constantly thirsty, restless, and sleepless, but the intelligence remains clear. This stage seldom lasts over twenty-four hours. A great many of the patients die during this stage, a few recover, a few go on to the fourth stage.

In the fourth stage, that of reaction, the skin continues to feel cold, but the temperature rises to 99° or 100°. The purging and vomiting cease; the radial pulse can again be felt; the breathing is rapid; the urine is suppressed; the patients are semi-comatose. One or other of the inflammations of the pia mater, larynx, lungs, stomach, or intestines is developed, or abscesses are formed in the parotid, or in other places. Very few of the patients who pass into this stage recover.

Treatment.—The most important part of the treatment of cholera is its prevention. It is evident, when we remember the way in which the poison of cholera is eliminated from the body, the way in which it is taken into the body, and the ways in which it can be destroyed, that it ought not to be difficult to prevent the spread of the disease. It is only necessary to disinfect the fæces, and to see that infected fæces are not introduced into the mouth with water, food, etc.

Of the disease itself, apparently, there is no satisfactory treatment, except during the first stage of diarrhœa. Then the patients should be kept quiet, on a restricted diet, the bowels first moved with a mild laxative, and then kept quiet with small doses of opium.

YELLOW FEVER.

Causes.—Yellow fever is endemic in the West India Islands, in some places on the shores of the Gulf of Mexico, and on the west coast of Africa.

From these places the disease has been carried to different places in the United States, Central America, South America, and Spain, producing epidemics in these places.

We are still ignorant of the micro-organism which probably constitutes the poison of the disease; nor do we know how it is eliminated from, or taken into, the body.

The poison of the disease requires a temperature of 70° for its growth and development. It is capable of remaining in clothing, bedding, ships, etc., and retaining its vitality for a long time.

Cities are more liable to the disease than country places; dirty cities are more liable than clean ones.

The inhabitants of countries where the disease is endemic are less liable to it than are strangers. One attack confers a less liability to a second attack.

Lesions.—There is well-marked jaundice of the skin and other tissues. There are often ecchymoses in the skin.

The wall of the heart is in the condition of granular and fatty degeneration.

The lungs are congested.

The stomach contains more or less black fluid, its mucous membrane is congested. The intestines may contain blood.

The liver shows the changes of acute degeneration. The liver-cells are swollen, coarsely granular, or disintegrated.

In the kidneys we find the changes belonging to an intense form of acute degeneration. The kidneys are large, the renal epithelium is degenerated, or dead, the tubes contain cast matter.

The period of incubation of yellow fever varies from twenty-four hours to several weeks; usually it only lasts for a few days.

Symptoms.—Occasionally there is a prodromic period, lasting for several days, marked by headache, giddiness, and loss of appetite, but more frequently the invasion is sudden, marked with chill, or sometimes with general convulsions.

During the first stage the temperature runs up rapidly, reaching 103° to 110° by the end of the first twenty-four hours. The pulse is a full pulse of 80 to 120, but sometimes is very slow. There are headache, pains in the back, restlessness, sleeplessness, delirium, vomiting of food, constipation. The face is flushed, the tongue is coated, the urine contains albumin and casts.

Exceptionally, during the first stage the fever is moderate, there is no delirium, but little prostration, and the patients are not confined to bed.

The first stage lasts for from two to six days.

During the second stage of the disease the temperature and the pulse fall to the normal, and the patients are better in every way. Some then go on to convalescence; others, after one or two days, go on to the third stage.

During the third stage the vomiting of food continues, and is succeeded by the vomiting of a blackish fluid, the so-called black vomit. The patients become jaundiced, are dull and stupid, and complain of pain in the abdomen. There may be bleeding from the nose, mouth, intestines, and kidneys, or into the skin and connective tissue.

The urine is very scanty, or suppressed.

The conditions of alternating stupor and delirium are very marked.

The third stage lasts for from one to three days.

The mortality of the disease is very high.

Treatment.—The preventive treatment consists in isolating the patients, and in destroying or disinfecting the clothes, bedding, etc.

The treatment consists principally in an attempt to alleviate symptoms.

The bichloride of mercury, combined with soda, has been recommended for the treatment of the disease itself.

Cocaine, given by the mouth, is used as a remedy for the vomiting.

TYPHUS FEVER.

Synonyms.—Typhus exanthematicus. Putrid, camp, jail, hospital, ship, or spotted fever.

History and Causes.—Typhus fever is endemic in Ireland, England, and Russia. In other countries it occurs from time to time in epidemics. It has regularly accompanied wars, famines, and the crowding of prisons, ships, and houses, with ill-nourished and ill aerated human beings.

Epidemics have occurred in this way in all parts of Europe.

In the United States there have been a few epidemics, mostly in the cities on the sea-coast.

In New York the last severe epidemic was in 1863 to 1864. In 1882 there were a few cases of typhus in the city, but hardly an epidemic.

Although no age is exempt from the disease, the maximum liability is between the ages of fifteen and twenty years.

The disease is apparently not influenced by the seasons of the year, or by atmospheric conditions.

The poison of the disease has not as yet been demonstrated. It seems to be given off from the surface of the sick body, to float in the air, and to contaminate bedding, clothing, etc. So we find that the disease is communicated from person to person, and by clothing, bedding, and rooms. Nurses and physicians very often contract the disease. It is much more easily taken by persons who are poor, badly fed, and over-crowded. Few people escape the disease if they are sufficiently exposed. It seems to be most contagious from the end of the first week up to the time of convalescence.

The accumulation of patients in the same room renders the disease more contagious.

It is an exceptional thing for any person to suffer from more than one attack of the disease.

Period of Incubation.—The symptoms may appear a few hours after exposure. Usually they appear between eight and twelve days after exposure, rarely, if ever, after a longer period than twenty-one days.

Lesions.—The only characteristic lesion of the disease is the eruption. But after death a number of secondary lesions may be found.

There may be a cute meningitis. There may be catarrhal or croupous inflammation of the pharynx and larynx.

In the lungs we find bronchitis, broncho-pneumonia, hypostatic congestion, or œdema.

In the heart there may be degeneration of the muscular fibres.

The liver and spleen may be the seat of acute degeneration.

In the ileum the agminated glands may be a little swollen, as may also the mesenteric glands.

The voluntary muscles in different parts of the body may be the seat of acute degeneration.

In the kidneys we find the lesions of the mild or severe forms of acute degeneration, or those of acute exudative nephritis.

Symptoms.—During the first week there is a general venous congestion of the face and conjunctiva, and a dull, apathetic expression. During the second week the patients look like persons in the third week of typhoid fever.

The tongue is at first coated and moist, later dry and brown.

Cerebral symptoms are marked—restlessness, sleeplessness, delirium, and stupor. The delirium is attended with illusions, is often violent, and is worse at night. It may mark the invasion of the disease, it may simulate an attack of acute mania, or it may not be developed until the second week. It is always a dangerous delirium, and one which needs constant watching. As the delirium subsides the stupor increases, but without natural sleep.

Sometimes the patients develop the condition called "coma vigil." They are unconscious, with open eyes, a rapid and feeble pulse, shallow breathing, and a cold skin.

Headache and pains in the back and limbs are early and frequent symptoms.

Vomiting and tympanites are not very common.

Constipation is the rule until the close of the disease, but there may be diarrhœa throughout.

The prostration is marked, but during the first week may be less evident by reason of the active delirium.

The eruption is very constant, but varies in its extent. It appears from the fourth to the seventh day, and lasts from seven to ten days. There is only a single crop. It appears on the arms, legs, and trunk. It is in the form of irregular, rounded, pinkish blotches resembling the eruption of measles. The spots become darker with time, or may be quite dark from the first. There is also sometimes a deep mottling in the skin, and sometimes a general erythematous blush. From the eighth to the tenth day there may be small ecchymoses in the blotches of the eruption. After the eruption has disappeared there is more or less desquamation.

The temperature rises rapidly, and reaches its maximum between the second and tenth day, usually between the fourth and seventh day, reaching 104° to 106° F. At first the temperature is nearly continuous, by the seventh to the tenth day there are morning remissions. In favorable cases, about the fourteenth day the temperature suddenly falls.

The pulse is at first about 100 and full, later it becomes rapid and feeble. Or it may be rapid and feeble from the first, or slow and feeble throughout the disease.

The heart's action in the second week becomes feeble, and its first sound less distinct.

The breathing is rapid, and in the second week is rendered worse by the hypostatic congestion, œdema, bronchitis, or broncho-pneumonia.

The kidneys become the seat of acute degeneration, or acute exudative nephritis, with diminution in the quantity of urine, and more or less albumin and casts.

Muscular tremor, twitching of the muscles of the face, subsultus tendinum, picking at the bed-clothes, and automatic movements of the arms and legs, may be developed during the second week.

General convulsions sometimes occur in the second week, with the severer forms of nephritis.

In the later stages of the disease there is retention of urine, incontinence of fæces, and difficulty in swallowing.

Severe catarrhal or croupous inflammations of the pharynx or larynx are sometimes developed.

Acute meningitis, with an exaggeration of the cerebral symptoms belonging to the typhus fever, is a dangerous complication.

There may be bleeding from the mucous membranes into the skin, the serous membranes, and the muscles. The most dangerous hemorrhages are those from the stomach.

Often there is suppuration of one or both parotid glands.

Not infrequently there is thrombosis of one or both femoral veins, less frequently of the sinuses of the dura mater.

Bed-sores are easily formed and very troublesome.

Course of the Disease.—There may be a prodromic period marked by general malaise, headache, vertigo, and loss of appetite.

The invasion of the disease is usually sudden, marked by chills, fever, headache, pains in the back and limbs, loss of appetite, vomiting, restlessness, sleeplessness, and prostration. From the fourth to the seventh day the eruption appears.

In the second week come the alternating delirium and stupor, the dry tongue, the typhoid state, the feeble heart-action, the complicating lesions.

In the favorable cases, about the fourteenth day the temperature falls, the patients begin to sleep, and then convalescence commences.

The regular duration of the disease is fourteen days. Murchison, in 500 cases of recovery, gives the subsidence of the disease as between the seventh and the twentieth days; in three-fourths of the cases between the thirteenth and sixteenth days. In 100 fatal cases death took place between the sixth and the twentieth days. There are some very bad cases which only live a few hours.

Sequelæ.—In some cases a condition of mental imbecility continues for several weeks.

In some patients aphasia or hemiplegia follow the disease.

There may be paralysis of groups of the voluntary muscles.

The Prognosis is always grave. The disease is especially fatal in elderly persons, and in those enfeebled by starvation. Some epidemics are more fatal than others.

Treatment.—The patients are to be isolated as far as possible. It is important not to accumulate many patients in the same room or building, and to provide for the largest possible quantity of fresh air. The clothing and bedding must be burned, or thoroughly disinfected.

In the treatment of the disease the most important points are the very large admission of fresh air and the nursing. Alcoholic stimulants in large quantities are often of service, but must be given with judgment.

TYPHOID FEVER.

An infectious disease characterized by fever and the development of lesions in the lymphatic glands of the intestine and mesentery.

Lesions.—1. The characteristic lesions :

By the second day of the disease, the solitary and agminated glands of the intestine are swollen, and the swelling increases during the first week. In the second week there is more or less necrosis of the swollen glands, with ulceration or sloughing. In the fourth week there is cicatrization of the ulcers.

The swelling of the glands may be moderate, and not go on to ulceration or sloughing ; it may be greater, with the formation of small ulcers ; it may be very great, with extensive necrosis and sloughing.

A number of the glands are attacked at the same time, or first those in the lower part of the ileum are involved, and later those farther up.

The lesions may be confined to the agminated glands, or involve also the solitary glands, or extend to the solitary glands of the colon.

The cases vary as to the number of glands involved, the degree of the swelling, the size and depth of the ulcers.

The mesenteric glands are usually only swollen, sometimes they suppurate. They may excite a local or a general peritonitis.

2. The accessory lesions :

The spleen is usually large and soft. In the ileum and colon there may be catarrhal or croupous inflammation.

There may be peritonitis from perforation of the intestinal ulcers, from the diseased mesenteric glands, or without discoverable cause.

The softened spleen may rupture. The hepatic cells may be the seat of acute degeneration.

The kidneys exhibit the lesions of acute degeneration, or of acute exudative nephritis.

The heart-walls are often soft and flabby. The parotid glands may suppurate. In the pharynx and larynx there may be catarrhal or croupous inflammation.

The lungs are often the seat of hypostatic congestion, of bronchitis, of broncho-pneumonia, or of lobar pneumonia.

There may be acute meningitis. The peripheral nerves may be the seat of an acute degeneration.

There is degeneration, and sometimes rupture, of the voluntary muscles.

There may be thrombosis of the femoral veins, or of the sinuses of the dura mater.

The characteristic micro-organism of the disease is a bacillus which is found in the intestinal lesions and in the contents of the intestines. It is also found in the mesenteric glands, the spleen, the liver, the kidneys, and the blood.

The bacilli are discharged from the typhoid patient principally with the fæces. They can live for a long time outside of the body, under favorable conditions.

They are most frequently taken into the body with contaminated water and milk.

Typhoid fever prevails in the form of local epidemics, as an endemic disease, and in the form of isolated cases.

The history of a local epidemic is apt to be as follows: A person already suffering from typhoid fever goes to a house in the country, or in a village where the disease has not previously existed. He goes through the disease at this place. His fæces are put in a privy vault, or cesspool; his soiled clothes and bedding are washed without being disinfected. The persons who handle and wash the soiled clothes often contract the disease. The contents of the infected privy or cesspool after a time drain into the adjoining well, most of the persons who drink this contaminated water have typhoid fever. The persons living in the same village who do not drink the contaminated water, nor handle the infected clothes, do not have the disease.

Occasionally, the disease is given by milk which has been contaminated by the infected water.

In some places typhoid fever is an endemic disease, prevailing year after year. When this is the case the disease is regularly much more prevalent in the autumn months, and varies in different years as to the number of cases and the type of the disease.

The most puzzling cases to account for are the isolated cases which occur from time to time in cities.

The disease seems to protect against itself, and the same person rarely suffers from two attacks.

Symptoms.—The regular duration of the disease is four weeks, and to each week belongs its own set of symptoms.

The regular course of the temperature is as follows:

During the first week the temperature rises regularly from day to day, always with a lower temperature in the morning and a higher temperature in the evening, but with each day the difference between the morning and evening temperature becomes less.

During the second week the temperature is always high, with but little difference between the morning and evening temperature.

In the third week the morning temperature begins to fall, the evening temperature remaining the same.

In the fourth week the morning temperature falls still lower, then the evening temperature falls, until finally both get down to the normal.

The maximum temperature is reached between 5 and 12 P.M. The minimum temperature is recorded between 6 and 8 A.M.

Variations from the Regular Temperature.—In the first week the invasion may be ushered in by a chill, and similar chills may be repeated for several days.

The temperature may rise rapidly, and reach 104° F. by the first, second, or third day.

In the second week there may be no difference between the morning and evening temperature. There may be an unusual difference between the morning and evening temperature. The morning temperature may be the highest. There may be irregular rises and falls of temperature from day to day.

In the third week the temperature may be higher than at any time in the disease. The temperature may suddenly fall to the normal and not rise again, or it may fall and then go on again. There may be irregular changes in the temperature from day to day.

In the fourth week the temperature may fall to the normal, then rise and go on for from five to ten weeks.

Complicating inflammations change the course of the temperature.

Hemorrhages from the bowels are often followed by a marked fall of temperature.

An evening fever, sometimes followed by sweating, may be continued after the fourth week.

In fatal cases the temperature usually continues high up to death. But sometimes the temperature is not higher than 100° to 102° F. for several days before death.

The height of the temperature is regularly in proportion to the severity of the disease, but in some fatal cases the temperature is never very high.

The pulse regularly follows the temperature. During the first week it is from 80 to 100 and full; during the second and third weeks it is more rapid, more feeble, or dicrotic.

The feeble pulses are usually rapid, but sometimes slow.

The disease may run its entire course with a pulse between 60 and 80.

Cerebral Symptoms.—Headache, restlessness, irritability, and sleeplessness belong to the first week of the disease.

In the second week the patients are in a condition of apathy.

In the third week are regularly developed alternating delirium and stupor.

A violent delirium may come on in the first days of the disease.

The characteristic apathy may be absent, even in fatal cases.

The eruption is in the form of small, isolated, rose-colored, lenticular spots, slightly elevated, and disappearing on pressure. It appears on the front of the chest and abdomen, sometimes on the back. There are only a few spots, or many. It appears between the seventh and twelfth days, exceptionally between the fourth and twentieth days. There are successive crops of eruption, so that it lasts from seven to twenty-one days, but it may only last for from two to four days.

Relapses are marked by a fresh eruption. Spots may continue to appear after convalescence has commenced.

In some cases no eruption can be demonstrated.

The tongue is at first moist, with a broad strip of white fur down the centre. In the milder cases the tongue remains moist throughout the disease, in the more severe cases it becomes dry, brown, and fissured. Or the tongue remains clean, but becomes dry, glazed, and fissured.

Nausea and vomiting are often present during the first week. Later in the disease there may be vomiting from the tympanites, from the retention of food in the stomach, or from peritonitis.

Some distention of the intestines with gas is usually present; marked distention is an unfavorable symptom; extreme distention may so interfere with the action of the heart and lungs as to cause alarming pulmonary and cardiac symptoms.

Diarrhœa is a regular symptom of the disease, several loose, fecal passages every day, of the appearance of pea-soup. Such a diarrhœa may be one of the first symptoms; it may not come on until the third or fourth week; it may not begin until after the patient has taken a purgative; it may last for a few days, or throughout the disease. A severe diarrhœa is an unfavorable symptom. In some epidemics but few patients have any diarrhœa at all.

Hemorrhage from the intestines occurs in a moderate number of the cases. During the first week there may be moderate bleeding from the congested mucous membrane.

The more important bleedings are from the ulcers in the intestines. They occur most frequently in the third and fourth weeks, but are sometimes seen as early as the second week, sometimes not until after the fourth week, or even in convalescence. The hemorrhages are small or large, single or repeated. Large hemorrhages are regularly followed by a temporary fall of temperature. The hemorrhages are usually, but not always, preceded by diarrhœa. Such hemorrhages are sometimes fatal, and it is even possible for a patient to bleed to death in this way without the escape of any blood from the rectum.

There is often epistaxis, either early or late in the disease, single or repeated, rarely so profuse as to be dangerous.

The eyes in the third week may become somewhat insensible to light, with dilated pupils.

Ringing and buzzing sounds in the ears may be complained of in the first week; in the third and fourth weeks there may be more or less deafness.

Subsultus tendinum, muscular tremor, picking at the bed-clothes, the involuntary passage of fæces, and retention of urine belong to the third and fourth weeks.

The condition of the urine varies with that of the kidneys. The most common lesion is a mild form of acute degeneration, with a little albumin and a few casts in the urine. In the protracted cases, however, the degeneration of the epithelium becomes very marked. Less frequently there is an acute exudative nephritis, with diminution in the quantity of urine, numerous casts, and considerable quantities of albumin.

Bronchitis may be developed at any time in the disease. It is usually confined to the larger tubes, and not very severe.

Broncho-pneumonia is a much more serious complication. It may be developed at any time in the course of the disease. When it occurs in the first week, it is often very difficult to tell whether the patients have pneumonia, or typhoid fever complicated by pneumonia.

Catarrhal pharyngitis is very often present, croupous pharyngitis but seldom.

Catarrhal or croupous laryngitis, ulcers of the larynx, and œdema of the glottis, are occasionally met with.

Suppurative inflammation of the parotid glands belongs to the later periods of the disease.

During the third and fourth weeks, sometimes earlier, there may be thrombosis of the veins. The veins most frequently affected are the femoral veins and the sinuses of the dura mater. The formation of a thrombus is attended with a rise of temperature and increased prostration. With thrombosis of the femoral vein there is pain and tenderness over the vein and œdema of the leg.

With thrombosis of the sinuses of the dura mater there is loss of consciousness, or hemiplegia, according to the position of the thrombus.

From thrombosis of the femoral vein patients usually recover, but thrombosis of the sinuses of the dura mater is usually fatal.

In some patients the disposition to bleeding from the different mucous membranes is very marked.

Catarrhal, or croupous, inflammation of the colon may accompany or follow typhoid fever.

Perforation of the intestinal ulcers is a very fatal lesion. It happens most frequently in the third, fourth, and fifth weeks. It may happen in the second week, or after convalescence is established. It is most common in severe cases, but may occur in the very mild ones. It is followed by the symptoms of shock, and the development of a general peritonitis.

Peritonitis is produced, not only by perforation, but also by an extension of the inflammation from the wall of the intestines, by inflammation of the mesenteric glands, and by infarctions of the spleen. It usually gives well-marked symptoms of acute general peritonitis, and is very fatal.

Course of the Disease.—The period of incubation is said to vary between two days and four weeks, the ordinary period is two weeks. In many cases there is a prodromic period of several days' duration. It is not always easy to separate the prodromic stage from the period of incubation.

During this stage of the disease the patients complain of lassitude, headache, and disturbances of the stomach and bowels.

The invasion of the disease is gradual, or sudden with one or more chills, or with an acute broncho-pneumonia, or with acute delirium.

During the first week there are the characteristic temperature, epistaxis, pharyngitis, headache, vertigo, apathy, sleeplessness, pain in the neck, back, and abdomen, the coated tongue, loss of appetite, nausea, vomiting, diarrhœa or constipation, blood with the stools, prostration.

It is often difficult to fix the date of the first day of the disease. The ordinary rule is to take the first day when the patient takes to his bed.

During the second week of the disease there are the characteristic temperature, the increased rapidity and feebleness of the heart's action, more apathy, delirium, noises in the ears, deafness, the dry tongue, the eruption, diarrhœa or constipation, tympanites.

At the end of the second week the patient may die, he may become convalescent, or the disease may continue.

During the third week there are the characteristic temperature, the heart's action more rapid and feeble, the cerebral symptoms more marked, the full development of the typhoid state, bleeding from the intestinal ulcers, peritonitis, involuntary passage of fæces, retention of urine.

In the fourth week, if the case is a favorable one, there is a gradual abatement of all the symptoms, and convalescence commences in the fifth week. If the disease is to be protracted, the symptoms of the fourth week will continue like those of the third, or there will be an improvement for one or two days, and then the disease goes on again.

The relapses of typhoid fever are a curious feature of the disease. They seem to be a fresh attack of the disease produced by a fresh infection from the patient himself. Each relapse is attended with a new intestinal lesion, a new eruption, and a repetition of the symptoms of the disease.

The intermission between the end of the original attack and the beginning of the relapse is from three to twenty-five days, the ordinary period is from ten to fourteen days. The relapse lasts from seven to thirty-nine days, the ordinary duration is from ten to fourteen days. A single relapse is not uncommon, more common in some epidemics than in others. A second relapse is comparatively rare.

The Irregular Cases. 1. *The Mild Form.*—The pulse and temperature remain nearly or quite normal. The patients have irregular feelings of heat and cold, headache, irritability, sleeplessness, loss of appetite, and general prostration and discomfort, but are not sick enough to be in bed. The bowels continue regular, or there may be constipation, or diarrhœa.

In some of the patients bronchitis is a prominent symptom, in others nausea and vomiting.

The patients remain in this condition for three or four weeks. They are liable to hemorrhage from the intestines, to perforation of the intestinal ulcers, and to attacks of delirium.

2. *The Short Form.*—The whole duration of the disease is only two weeks.

In some of the patients there is a considerable rise of temperature, of which the rise and fall are alike rapid.

In other cases there is no fever, only lassitude, headache, and loss of appetite.

3. *Typhoid Fever Complicated by Malarial Poisoning.*—It is possible for a patient to be infected at the same time by the poisons of typhoid fever and malaria. He will then go through a disease with lesions and symptoms belonging to both these morbid states.

Convalescence begins regularly in the fifth week. If uncomplicated it progresses steadily, but yet it is months before the patient is really like himself.

The convalescence may be interrupted in several ways:

An afternoon fever may continue for a number of days.

There may be severe pain in the back, apparently due to inflammation of the periosteum of the vertebræ.

The mind may remain dull, apathetic, and feeble for days or weeks.

There may be hemiplegia, dependent on thrombosis of the sinuses of the dura mater; or paralyses of groups of muscles due to changes in the peripheral nerves.

There may be hemorrhage from intestinal ulcers which have not healed, or perforation with peritonitis.

There may be a catarrhal gastritis with pain, nausea, and vomiting.

There may be catarrhal or croupous inflammation of the colon, with the symptoms of dysentery.

There may be rapid and irregular heart action.

The patients, after beginning to convalesce, may make no real progress and die in an emaciated and feeble condition.

The Prognosis of typhoid fever is a very uncertain one.

Cases, which are at first mild, may later turn out very badly.

The cases with high temperatures and with nearly continuous temperatures, are always severe.

A profuse and continued diarrhœa is a serious symptom.

Very marked distention of the intestines with gas belongs to the bad cases.

Hemorrhages from intestinal ulcers, even if they are not of themselves fatal, belong to the severe cases of the disease.

Perforation of an intestinal ulcer, or peritonitis from any cause, is nearly uniformly fatal.

Severe muscular tremor indicates the existence of deep intestinal ulcers.

Epistaxis is not often of itself serious, but its early and repeated occurrence belongs to the more severe cases.

The sooner the patient goes to bed after the invasion of the disease the better the prognosis.

The mortality varies in different epidemics, and in different years, in places where the disease is endemic.

Treatment.—1. To prevent the disease.

The fæces should be received into a vessel containing a sufficient quantity of disinfecting fluid, and thoroughly mixed with this fluid before being emptied into the common receptacle.

The following are efficient disinfecting fluids:

℞.	Bichloride of mercury	ʒ ij.
	Acid hydrochloric	ʒ x.
	Water	1 gallon.
M.		
℞.	Bichloride of mercury	ʒ ij.
	Permanganate of potash	ʒ ij.
	Water	1 gallon.
M.		
℞.	Chloride of lime	℥ iv.
	Water	1 gallon.
M.		

All the soiled clothes are to be soaked in one of these solutions, or steamed before they are washed.

Persons travelling or living in localities where typhoid fever exists must be very careful about drinking the water of the place.

Treatment of the Disease.—The patients are to be put to bed and placed on a fluid diet as soon as possible.

During the first week the patients are troubled by headache, restlessness, irritability, and pains in the stomach. These symptoms can be alleviated by sulfonal, opium, and the bromides, but these drugs are to be used sparingly and with caution.

Vomiting can usually be relieved by attention to the food.

If the bowels are constipated, they should be moved once in three days by an enema; if there is too much diarrhœa, it must be checked to some extent by opium.

The milder nose-bleeds require no treatment; for the more severe ones it is necessary to plug the nostrils.

If the pharyngitis is troublesome, local applications of cocaine give relief.

The mouth and tongue are to be kept clean.

The heart's action during the first week usually continues good.

As regards the temperature, the following propositions may be stated:

The temperature as such does not add to the dangers of the disease, nor require treatment.

The systematic use of cold baths of the temperature of 65° F. lowers the mortality of the disease, but not because it lowers the temperature. High temperatures may make the patients uncomfortable, and it may, therefore, be proper to give antipyretic drugs, although these drugs do not increase the probability of recovery.

In the second week the heart's action often begins to fail and calls for the use of alcoholic stimulants.

If there is excessive distention of the intestines by gas, we employ hot or cold applications over the abdomen, the internal administration of turpentine or asafœtida, or placing a soft rubber tube in the rectum.

For the bleeding from the intestinal ulcers we give opium and apply cold over the abdomen.

For excessive muscular tremor we give opium, asafœtida, or the compound spirits of ether.

In the third week we have to care for the retention of urine, the formation of bed-sores, the suppurative inflammation of the parotid glands, the thrombosis of the veins, and the peritonitis.

Convalescence.—The principal point in a normal convalescence is to manage the transition from fluid to solid food. In my opinion this transition should usually not be delayed for more than a few days, and the best solid food to begin with is beef or mutton.

When the typhoid fever seems to have run its course, and yet an afternoon fever continues, there may be an advantage in the use of quinine, and in these patients we do not always wait for a normal temperature before we begin the use of solid food.

RELAPSING FEVER.

Synonyms.—Famine fever. Spirillum fever. Typhus recurrens.

History and Causes.—Epidemics of this disease have occurred since 1739, in Ireland, England, and Scotland. From 1863 to 1873 there were epidemics in Russia and Germany. In India there were epidemics from 1877 to 1880. In New York there were epidemics in 1847, and in 1869 to 1870.

The disease occurs regularly in epidemics. It has often followed famines, and is especially prevalent among the poor and destitute. It is very contagious, but we do not know the exact way in which the disease is transmitted from one person to another. One attack does not protect against subsequent attacks. As a rule, epidemics, when they have run their course, disappear completely, but in a few places the disease has become endemic.

Lesions.—The pharynx may be the seat of catarrhal or croupous inflammation.

The stomach may be congested, or there may be extravasations of blood in its mucous membrane.

The small and large intestine may be the seat of catarrhal or croupous inflammation.

The liver may be the seat of acute degeneration and increased in size.

The spleen is large and soft, it may contain infarctions, it may rupture.

There may be a general peritonitis. The muscular fibres of the wall of the heart may be degenerated.

The larynx may be the seat of catarrhal or of croupous inflammation.

Bronchitis, broncho-pneumonia, lobar pneumonia, and pleurisy, are not infrequent.

In the kidneys acute degeneration of mild, or of severe, type is regularly present.

The characteristic micro-organism of the disease is a spirillum which is found in large numbers in the blood. It is found most constantly in the febrile stage of the disease. The blood containing the spirilla, when inoculated in monkeys, reproduces the disease. It is, however, not known how in the human subject the micro-organism is eliminated from the body of the sick person, or how it is transferred from one person to another.

The period of incubation of the disease seems to vary from a few hours to twenty-one days.

Symptoms.—The invasion of the disease is regularly sudden. There are chills, headache, pains in the back and limbs, and prostration. Very soon the temperature rises, and soon runs up to 104°, to 108°. The headache is worse, the tongue is coated, there is vomiting of food, of greenish or of coffee-ground matters.

The patients cannot sleep, there are pain, tenderness, and enlargement of the liver and spleen.

Between the third and tenth day, usually on the fifth or seventh, there is an abrupt fall of temperature, with sweating, epistaxis, diarrhœa, or hemorrhages from the bowels or stomach. For about seven days the cessation of fever continues, and then there is a relapse, with all the symptoms of the first attack. The relapse lasts for from one to seven days, usually for three. There may be a second, third, or fourth relapse. Rarely, there is no relapse at all.

There is no characteristic eruption, but in some epidemics roseola, or a reddish mottling of the skin, or petechial spots are present.

The bowels are sometimes constipated, sometimes loose.

Jaundice may appear in the first paroxysm, in the second, or in both. It belongs to the severe cases.

The urine varies with the severity of the acute degeneration of the kidneys. There may be a good deal of pain in the muscles and joints during the disease, or in convalescence.

Rarely, there are general convulsions at the time of the fall of temperature.

Complications and Sequelæ.—There may be laryngitis, bronchitis, pleurisy, lobar pneumonia, rupture of the spleen, acute colitis, or peritonitis.

During convalescence there may be inflammation of the ciliary body or choroid coat of the eye; or paralysis of groups of muscles.

Prognosis.—The mortality varies with the epidemics and with the previous condition of the patients.

The bad cases are characterized by hemorrhages from the stomach and bowels, cerebral symptoms, suppression of urine, pneumonia, peritonitis, dysentery, and collapse at the time of the fall of temperature.

Treatment.—The prophylactic treatment has to be general and efficient, on account of our ignorance of the way in which the poison of the disease itself is eliminated from the body.

Of the disease itself, the treatment consists wholly in the nursing and the alleviation of symptoms.

THE MALARIAL DISEASES.

THIS name is given to a group of disorders which are produced by a special poison, originating in the earth and taken into the bodies of human beings. These disorders are called Intermittent Fever, Remittent Fever, and Malarial Cachexia.

The malarial diseases exist in their most severe forms in Africa, Asia, India, China, the West India Islands, South America, and Central America. In these countries remittent fever and malarial cachexia prevail constantly, are of severe type, and are often fatal.

These diseases exist in a well-marked form in the southern and western portions of the United States, in parts of Russia, Greece, Hungary, Italy, Germany, France, the Netherlands, Spain, England, and Scotland. In these countries intermittent fever, remittent fever, and malarial cachexia prevail nearly constantly, occur in epidemics, and exhibit varying degrees of severity. The disease will from time to time invade fresh districts, or will assume the mild form, or may disappear altogether from regions where it has already prevailed.

The mild form of malarial disease is seen in the middle and eastern portions of the United States and in parts of Europe. Intermittent fever and malarial cachexia in their milder forms come and go in different localities, sometimes very prevalent, sometimes rare, sometime disappearing altogether.

In the countries where the most severe form of malaria exists, the rainy season is the worst.

In those countries where its well-marked form prevails, it is most frequent in the summer and autumn.

In those places where the mild form of the disease belongs, it is most common in spring and autumn.

The ordinary rules are: That the frequency of the disease diminishes with the elevation above the sea-level; that marshy soils are the worst and sandy soils the best; that the draining of marshes and ponds, the cultivation of virgin soil, and the abandonment for a long time of cultivated soil are followed by an increased prevalence of the disease.

Where the mild forms of the disease exist, it is difficult to lay down any rules as to the conditions which favor the appearance and disappearance of the disease.

There seems to be a well-marked difference in different individuals as to their susceptibility to the disease.

Lesions.—The poison of the malarial diseases is a form of protozoa, called the "plasmodium malariæ." The organism seems to originate, live, and grow in the earth and water, and to be capable of floating in the air. It is apparently taken into the human body through the lungs. After they have been taken into the human body the micro-organisms find their way into the red blood-cells, they increase in size, they multiply, they destroy the red blood-cells with liberation of their pigment.

In its earliest form the plasmodium is in the form of very small, pale, crescentic or irregular bodies contained within the red blood-cells. These bodies increase in size, the red blood-cells are destroyed, their pigment is set free, and is found in blackish granules in the plasmodium, in the white blood-cells and in free masses and granules.

The pigment is especially abundant in the blood of the liver and spleen. Some of the organisms assume a peculiar shape, as of a body with long threads projecting from it. After a time there is a segmentation of the organisms and the formation of a new crop, which again invade the red blood-cells.

The spleen is very often hypertrophied. The red blood-cells are diminished in number. The pigment due to the destruction of the red blood-cells may be found within the blood-vessels in all parts of the body, but in the liver and spleen the quantity is so great that these organs are fairly black.

INTERMITTENT FEVER.

The period of incubation varies from a few days to several months.

When the disease has once been acquired, the paroxysms may return at intervals, without fresh exposure, for many years. Change of climate, and accidental circumstances, may be the exciting causes of paroxysms.

The symptoms occur in paroxysms which are repeated at regular intervals, every day, every other day, or at longer intervals. The paroxysms are repeated at the same hour on the successive days, or the time may be anticipated or postponed.

Each complete paroxysm has three stages: the cold, the hot, and the sweating.

The cold stage is attended with chills, a cold skin, a rapid pulse, and irritability of the stomach. It lasts for from half an hour to two hours.

The hot stage is attended with a rapid rise of temperature, the skin is hot and dry, the pulse full and rapid; vomiting, headache, and pain in the back are present. It lasts for from two to twelve hours.

In the stage of sweating the temperature falls, all the symptoms subside, and there is profuse perspiration.

Irregular paroxysms may occur, in which either the cold or the sweating stage are absent.

When the paroxysms are repeated for a long time, the spleen is hypertrophied, the number of red blood-cells is diminished, and the general health is impaired.

Instead of a regular paroxysm, there may be a chill, a rise of temperature, and the passage of pigmented urine (intermittent hæmatinuria).

Pernicious Intermittent.—1. After the chill, instead of the fever, there is feeble heart-action and collapse.

2. In the third stage there is profuse sweating and collapse.

3. During the chill there is dangerous heart-failure.

4. In the second stage there is coma, or violent delirium.

5. In the second stage there is congestion of the lungs, with cough, dyspnœa, and profuse mucous expectoration.

6. In the second stage there is congestion of the stomach, with pain, vomiting, and hæmatemesis; or con-

gestion of the intestines with pain, purging, and bloody stools.

Treatment.—The inhabitants of malarial districts learn to select the situation of their houses, to look after their drainage, and to avoid the night air.

Persons who have to pass a short time in a malarial district do well to take from six to ten grains of quinine after breakfast every morning.

To abort a paroxysm we may give an hypodermic of one-fifth of a grain of muriate of pilocarpine, and one-eighth of a grain of sulphate of morphine, together, or a full dose of opium, or drachm doses of chloroform, or antifebrin, or antipyrine.

To cure the disease we may use quinine. The ordinary dose is from twelve to twenty grains between the paroxysms. The efficiency of the quinine is much increased by giving it in solution. In bad cases the dose must be larger.

In some cases we do better with Warburg's tincture in capsules, four to eight capsules a day.

In some cases there is an advantage in adding arsenic to the quinine.

In all cases it is the rule to continue the treatment for some weeks after the paroxysms have stopped.

In some cases the paroxysms cannot be stopped except by change of climate.

REMITTENT FEVER.

The invasion of the symptoms may be sudden, or preceded by one or more paroxysms of intermittent fever, or by a prodromic period of several days' duration.

The invasion of the disease is marked by one or more chills, more or less severe. The temperature begins to rise during the chills. The patients suffer from headache, pains in the back and limbs, a rapid pulse, a coated tongue, nausea, and vomiting.

There is a remission of the fever in the early morning, and sometimes a second remission in the evening. The bowels are constipated. The urine is acid and high-colored.

The fever lasts for from five to twenty-one days; it terminates in recovery, or in death, or is followed by intermittent fever.

In the mild cases the patients are not at any time very sick, and regularly recover.

In the severe cases the temperature is high and nearly continuous, the tongue becomes dry, the pulse is rapid and feeble, the patients pass into the typhoid state, with delirium and diarrhœa.

In the malignant cases the prostration, the cerebral symptoms, the jaundice, and the hemorrhages from the mucous membranes are marked symptoms.

Treatment.—At the commencement of the disease it is customary to give first a mercurial purge and then quinine, or Warburg's tincture. If these are of service their use is continued; if they exert no effect on the disease they are discontinued, and we fall back on the nursing and the treatment of symptoms, until the time for the subsidence of the disease, when the quinine may be tried again.

MALARIAL CACHEXIA.

Either with or without previous attacks of intermittent, or remittent, fever, persons may become the subjects of malarial cachexia.

The essential feature of malarial cachexia seems to be the destruction of red blood-cells and the consequent anæmia with its attendant symptoms. There is also regularly hypertrophy of the spleen.

The patients become pale, feeble, languid, and emaciated. They suffer from headache, neuralgic pains, and disturbances of digestion.

The condition of these patients is often very miserable, and it is possible for them to die with extreme anæmia, or leukæmia.

Treatment.—The most important point in the treatment of these patients is their removal from the malarial district to one where no malaria exists. In addition we employ arsenic, iron, and measures likely to improve the digestion and the nutrition.

THE MALARIAL DISEASES OF NEW YORK.

1. *The Intermittent Type.*—(a) The patients have regular and complete paroxysms of intermittent fever.

(b) They have paroxysms of fever alone, the temperature usually not over 100° F., at regular or irregular intervals, in the evening or at night.

(c) They have paroxysms without fever, but with malaise, headache, sleeplessness, irritability of temper, palpitation of the heart, loss of appetite, nausea, disturbances of the functions of the liver, and abnormal sensations. The paroxysms come on in the evening or at night, at regular or irregular intervals.

2. *The Remittent Type.*—(a) The patients have fever, 103°–104° F., with headache and moderate prostration, for two weeks, and then get well without further trouble.

(b) The patients have a little fever, 99°–100° F., higher every evening. This fever lasts for weeks and months. The patients are not in bed, but feel very miserably. They have headache, disturbances of digestion, abnormal sensations, lose flesh and strength.

3. *The Malarial Cachexia.*—This follows the ordinary type of the milder forms of malarial cachexia.

Treatment.—There is a very great difference in different patients as to the effect of remedies. Quinine, arsenic, or Warburg's tincture act quickly and efficiently for some, while for others they are absolutely useless Attention to the digestion, the general health, and change of climate are always necessary.

THE EXANTHEMATA.

The members of this group of the infectious diseases all have some features in common.

To each one belongs its own specific poison. In each of them the poison is conveyed from person to person through the air—they are contagious. Each of them has a regular period of incubation, of invasion, and of eruption. Each one of them is accompanied with a characteristic eruption, or rash of the skin.

SMALL-POX.

Lesions.—The characteristic lesion of the disease is the eruption.

The accessory lesions are the diffuse inflammation of the skin and of the mucous membranes, the acute degeneration of the liver, spleen, and kidneys, and the hemorrhages in different parts of the body.

History and Causes.—Small-pox is a disease which has existed for a great many years. Before the introduction of vaccination it was very prevalent and very fatal. The susceptibility of everyone to the disease, even of the fœtus in utero, is very marked. One attack of the disease regularly confers an immunity against subsequent attacks. The poison of the disease is very virulent, it is given off from the body of the sick person, it can float in the air, it can remain in bedding, clothing, etc., for a long time. The disease is contagious at all periods of its course, and even after death.

The period of incubation is from ten to thirteen days. During this time the patients have no symptoms.

The period of invasion is from two to three days. The invasion is sudden, marked by chills, a rapid rise of temperature, a full pulse from 100 to 120, rapid breathing, marked prostration, a coated tongue, vomiting, headache, delirium, convulsions, severe pain in the back. All these symptoms vary in their severity according to the severity of the attack. The disease may prove fatal during the period of invasion.

The Period of Eruption.—The eruption appears first on the face and scalp, and then extends over the skin and mucous membranes. At first there are rounded, red spots. On the second day of the eruption these spots have become papules; by the sixth day they have changed into umbilicated vesicles. By the eighth or ninth day the inflammation changes its character and becomes purulent, the vesicles are filled with pus, the papules beneath are infiltrated with pus; at this time is developed the diffuse inflammation of the skin and the mucous membranes.

As the eruption appears, the temperature falls and the constitutional symptoms subside.

The change of the inflammation to a suppurative form is marked by chills, a rise of temperature, and a recurrence of the symptoms of the period of invasion, all of which last for from three to eight days.

Then the inflammation subsides, the temperature falls, all the symptoms abate, the pustules dry up, scabs are formed, the scabs fall off and leave cicatricial depressions in the skin. Five or six weeks are required before convalescence is complete.

Convalescence may be interfered with by boils, erysipelas, gangrene of the skin, septicæmia, laryngitis, pleurisy, pneumonia, or myelitis.

The confluent form of small-pox is characterized by an unusually extensive and severe development of the eruption; by the high temperature, cerebral symptoms, and prostration which prevail throughout the disease; and by the liability to pericarditis, pleurisy, bronchitis, pneumonia, gastritis, enteritis, and nephritis.

The hemorrhagic form of small-pox is characterized by bleeding into the pustules and skin, from the mouth, nose, lungs, stomach, intestines, kidneys, and uterus.

The malignant form of small-pox is characterized by the very great prostration without very high temperatures; the cerebral symptoms; the development, after from eighteen to thirty-six hours, of a diffuse redness of the abdomen and thighs, looking like the rash of scarlatina and mottled with small hemorrhages; the absence of the regular eruption, or its representation by a few vesicles; the disposition to bleeding; the short duration of the disease—only from three to seven days; and its very great fatality.

Small-pox modified by vaccination (varioloid) runs a mild and short course. The symptoms during the period of invasion are not severe, they subside very decidedly with the development of the eruption, they do not return with any severity with the suppuration of the vesicles.

The eruption is not very extensive, the pocks are small, some of the vesicles dry up without suppurating, the pustules are not large or deep, desiccation takes place from the fifth to the seventh day of the eruption.

The patients regularly recover, and some are not sick enough at any time to be in bed.

Such a modified small-pox, however, is capable of giving the severe forms of the disease to persons unprotected by vaccination.

Mortality.—In the last century, in many countries, from seven to twelve per cent. of all the deaths were due to small-pox. Since the introduction of vaccination, the mortality has diminished very much.

Hemorrhagic and malignant small-pox are almost certainly fatal; confluent small-pox is very dangerous; from discrete small-pox the percentage of recoveries is considerable; varioloid is very seldom fatal.

Treatment.—Opinions vary in different places and among different physicians, as to whether vaccination alone is a sufficient protection to the community, or whether in addition small-pox patients should be isolated. There can be no question of the propriety of destroying all infected clothing, bedding, etc.

The patients are to be kept in bed, and fed and nursed as in the other severe infectious diseases.

During the suppurative stage of the inflammation of the skin, the same local treatment is to be used as is customary among surgeons in the treatment of any suppurating surface.

VACCINATION.

The great mortality from small-pox naturally led to attempts to protect the community against its ravages.

It was known that one attack of the disease protected against subsequent attacks, and so the trial was made of inoculation of matter from the pustules of small-pox. It was found that the protection afforded by inoculation was efficient, but that its practice was attended with inconvenience and danger.

Then the discovery was made that there was a disease of cattle—cow-pox—which resembles small-pox, and that the virus from cow-pox, when inoculated in human beings, gave them an immunity from small-pox. From the time of this discovery vaccination has become an established practice, and small-pox has lost its terrors.

When vaccination is practised in an unvaccinated person, on the third day a papule is formed; from the fifth to the ninth day a vesicle is formed on the papule; on the eighth day the papule and vesicle become the seat of suppurative inflammation; then the inflammation subsides, and from the twentieth to the twenty-fifth day the scab falls off and leaves a cicatrix in the skin. The evolution of the pustule is accompanied with slight constitutional disturbance.

When vaccination is practised in a person who has already been vaccinated, there may be nothing effected, or the formation of a localized inflammation of the skin, or an irregular vaccine pustule. The ordinary rule is to vaccinate all infants, to revaccinate once in about seven years, or oftener in case of exposure.

The protection afforded by vaccination varies in different individuals as to its length of time and its completeness. It may afford absolute immunity against small-pox, or it may only insure a mild form of the disease.

The only dangers attending vaccination are : erysipelas, septicæmia, and syphilis. All of these can be guarded against. It is customary to use the virus taken from the pustules of infants, or from the pustules of calves.

MEASLES.

Measles is a very contagious disease. Children are much more susceptible to it than are adults. It is contagious both in the period of invasion and in that of eruption. The poison of the disease is given off from the surface of the body, it floats in the air, it can be inoculated with the blood, it lodges in clothing, bedding, etc.

Among the tenement-house population, in asylums, and in armies the disease is often of severe type and fatal of itself, or by its complications. When introduced for the first time in savage tribes it is exceedingly fatal. But as we see the disease under ordinary conditions, it is of mild type and very seldom fatal.

Lesions.—The characteristic lesion is the eruption which appears on the skin and mucous membranes.

The accessory lesions are : the catarrhal inflammations of the mucous membranes of the eyes, nose, throat, larynx, bronchi, stomach, and intestines ; the croupous laryngitis ; broncho-pneumonia ; simple, suppurative, or tubercular inflammation of the bronchial or cervical lymphatic glands ; suppurative otitis ; acute degeneration of the kidneys, or acute exudative nephritis.

The period of incubation after inoculation with the blood is seven days ; after ordinary exposure, from ten to fourteen days. During the period of incubation there may be a little fever and disturbances of digestion.

The period of invasion lasts from twelve hours to six days, usually four days.

It is marked by chills, sometimes general convulsions, a rapid rise of temperature, headache, vomiting, and diarrhœa. At the same time are added the symptoms of the catarrhal inflammation of one or more of the mucous membranes. The cases vary as to the number and severity of the symptoms during the period of invasion.

The eruption is of maculo-papular form tending to the crescentic shape. The patches are of light or dark red color, of crescentic or irregular shape, scattered or confluent, flat or papular, sometimes covered with vesicles, sometimes hemorrhagic. There is more or less inflammation of the skin and mucous membranes between the blotches of the eruption.

The eruption appears on the face, neck, trunk, and extremities, and on the mucous membranes. It reaches its full development in from two to four days.

After from ten to fourteen days there is a fine desquamation.

The fever increases as the eruption is developed, and is usually highest as the eruption becomes complete.

At the same time there are often cerebral symptoms: restlessness, sleeplessness, stupor, delirium, convulsions.

During the period of eruption the patients suffer from the symptoms which belong to the inflammation of one or more of the mucous membranes.

The conjunctivitis is attended with pain and intolerance of light.

The pharyngitis causes pain in swallowing and cough.

The laryngitis gives pain, laryngeal cough, laryngeal voice, laryngeal dyspnœa.

With the bronchitis we find the ordinary symptoms and physical signs.

The gastritis produces pain and vomiting; the enteritis, pain and diarrhœa.

The eruption and the fever regularly subside in from two to seven days, desquamation follows, and convalescence is established from the tenth to the fourteenth day after the beginning of the eruption.

The complications of most consequence are: bronchopneumonia, gangrene of the mouth and vulva, suppurative otitis, adenitis, croupous laryngitis, and nephritis.

The course of the disease is regular, or very mild, or severe, or malignant.

The malignant cases are sometimes called "black measles." The eruption is imperfectly developed, but of very dark color; the prostration is extreme, with rapid and feeble heart-action, a cold skin, and a brown and dry tongue; there are marked cerebral symptoms and bleeding from the mucous membranes.

Convalescence may be interrupted by persistence of the conjunctivitis, pharyngitis, otitis, bronchitis, bronchopneumonia, gastritis, or tubercular adenitis. Or the patients may be left for a long time feeble and anæmic.

The prognosis in ordinary cases is very good. It is unfavorable in children under two years of age, in adults, in countries where the disease prevails for the first time, in armies, in asylums, and in tenement-houses.

Treatment is directed to the fever, the cerebral symptoms, the skin, the conjunctivitis, pharyngitis, laryngitis, bronchitis, broncho-pneumonia, gastritis, enteritis, and adenitis.

VARICELLA.

Chicken-pox.

This disease is almost confined to children, but yet is occasionally seen in adults.

It is fairly contagious, the poison is given off from the surface of the sick body.

The period of incubation is from thirteen to seventeen days.

The period of invasion lasts for one or two days. The patients have a little fever, disturbances of digestion, and slight prostration.

The period of eruption lasts from two to five day s First there are little rounded red spots in the skin, then papules, and then vesicles. Many of the vesicles then shrink and dry up, a few go on to form pustules. The vesicles, when they have run their course, leave the skin smooth ; the pustules leave little cicatricial depressions.

The eruption appears on the skin, scalp, mouth, and pharynx.

The disease is a very mild one, and in many cases there can hardly be said to be any symptoms except the eruption.

SCARLATINA.

Lesions.—The characteristic lesion is the eruption.

The accessory lesions are frequent and important.

The pharynx and tonsils are the seat of catarrhal, croupous, or gangrenous inflammation.

The larynx may be invaded by the croupous inflammation of the pharynx.

The Eustachian tube is often the seat of catarrhal inflammation, the middle ear of suppurative inflammation.

The cervical lymphatic glands may be swollen, or suppurate. The kidneys regularly are in the condition of acute degeneration, of acute exudative nephritis, or of acute diffuse nephritis.

Causes.—We are still ignorant of the exact nature of the poison of scarlatina. It seems to be given off from the skin and the breath of the sick person, to float in the air, and to lodge in clothing, bedding, and rooms.

The greatest liability to the disease is in children between the ages of two and seven years. Adults are less susceptible to the disease. A considerable number of persons enjoy throughout their entire life a complete immunity from the disease.

The puerperal conditions and surgical operations seem to render adults more liable to the disease.

One attack regularly protects against subsequent attacks.

The disease varies in its severity at different times and in different places.

The period of incubation is regularly seven days. The extreme limits are twenty-four hours and three weeks. There are no symptoms during the period of incubation.

The period of invasion lasts for from twelve to forty-eight hours, but is occasionally prolonged for several days. Its beginning is regularly marked by one of four symptoms: a sudden rise of temperature, general convulsions, vomiting, or sore throat. During the period of invasion the fever, with its attendant cerebral symptoms, pain, and prostration, is a prominent symptom.

The eruption is in the form of minute red points. These are numerous and close together, so as to form an extensive diffuse redness, or aggregated in irregular patches, or separated and scattered.

The eruption is found in the skin of the neck, trunk, and extremities. The face is not usually as much involved as in measles.

The eruption may appear only on the trunk, or on the limbs, or on the face.

It reaches its full development in from one to four days. At its maximum the skin is uniformly red, swollen, and tense.

The whole duration of the eruption is from three to ten days, exceptionally only a few hours. Desquamation should be completed by the end of the third week, but may be protracted for a longer time.

Although the eruption when regular is very characteristic, its irregular forms are obscure and puzzling. For we find many varieties in the appearance of the rash, the part of the skin involved, and the duration of the rash.

While the eruption is developing, the temperature rises; the sore throat, the cerebral symptoms, and the prostration continue; the tongue is at first coated with a white fur, then cleaned off, but with enlarged papillæ.

The Course of the Disease. — 1. The regular cases have a short period of invasion, with the symptoms already described. The eruption is characteristic, and reaches its full development by the fourth day. By the tenth day it has disappeared. About the seventh day all the constitutional symptoms subside. By the twenty-first day desquamation is completed and the disease has run its course.

2. The disease runs its regular course, but the fever, instead of subsiding on the seventh day, continues for one or two weeks.

3. The eruption is irregular as to its appearance, situation, or duration, while the other symptoms are regular.

4. There are very mild cases with but trivial constitutional symptoms, and a scanty and short eruption, but with the characteristic desquamation and the liability to complications.

5. There are cases in which the only symptoms are fever and sore throat.

6. There are severe and prolonged cases. The eruption is abundant or scanty, the constitutional symptoms are marked, especially the fever and cerebral symptoms. They continue for two or three weeks.

7. There are malignant cases. The cerebral symptoms are marked. The patients have very high temperatures, or low temperatures with collapse. The heart's action is very rapid and feeble. Vomiting, diarrhœa, dyspnœa, and bleeding from the mucous membranes are often present. The eruption is irregular and dark colored. The patients die in from eight hours to two days.

Complications.—The most constant complication is catarrhal inflammation of the mucous membrane of the pharynx or tonsils. Although this is only an ordinary pharyngitis or tonsillitis, yet the appearance of the throat is quite characteristic of scarlet fever. Such an inflammation may give pain, but is not dangerous.

Croupous inflammation of the pharynx or tonsils is a very serious complication. It behaves as it does in diphtheria, extending up into the nose, down into the larynx, trachea, and bronchi. The principal danger from it is the interference with the breathing.

Gangrenous inflammation of the throat is of rare occurrence. The inflammation is attended with necrosis and sloughing of portions of the mucous membrane, and with the constitutional symptoms of septic poisoning.

Suppurative inflammation of the tonsils behaves in the same way as the ordinary quinsy sore throat.

Catarrhal inflammation of the Eustachian tubes gives no marked symptoms while it is going on, but is often followed by deafness.

Suppurative inflammation of the middle ear is attended with a rise of temperature, pain, restlessness, sometimes stupor and delirium. These symptoms may be so marked as to simulate an acute meningitis. They continue until the membrana tympani is perforated and the pus escapes.

It is very rare for a case of scarlet fever to run its course without some change in the kidneys; there is acute degeneration, or acute exudative nephritis, or acute diffuse nephritis.

Acute degeneration of the kidney belongs to the first and second weeks of scarlet fever. It is of mild type. The quantity of the urine is but slightly diminished, its specific gravity is unchanged, it contains little or no albumin. There are no constitutional symptoms.

Acute exudative nephritis belongs to the second and third weeks of scarlet fever. The urine is scanty or suppressed, its specific gravity is unchanged, it contains large quantities of albumin, numerous casts, and blood. The temperature rises; there are prostration, headache, nausea, vomiting, anæmia, and dropsy. In some of the patients there is added contraction of the arteries, with disturbance of the heart-action and general convulsions, delirium, or stupor. Most of these cases of nephritis last about four weeks, and terminate in recovery. A smaller number prove fatal.

Acute diffuse nephritis belongs to the third week and the period of convalescence. It follows either an acute or subacute type. The acute cases in their early stages resemble exudative nephritis. In the subacute cases the symptoms are developed gradually. The urine is somewhat diminished in quantity, contains much albumin and casts, but no blood. There is no fever. The anæmia and dropsy are developed gradually. In all cases of diffuse nephritis the kidney disease is apt to persist and to go on, quickly, slowly, or with intermissions, up to the patient's death.

Inflammation of the lymphatic glands of the neck belongs to the middle or end of the second week. The glands are simply swollen, or they suppurate. Such an adenitis is accompanied with fever, and is sometimes protracted for a long time. Inflammation of the joints and muscles may occur as the eruption is subsiding. The joints most frequently inflamed are those of the hands and feet; the muscles, those of the neck. With the synovitis, or myositis there is more or less fever.

Acute pericarditis, or endocarditis, may complicate scarlet fever.

Meningitis, pleurisy, broncho-pneumonia, and peritonitis are comparatively rare complications.

Convalescence.—Some of the patients are left, after the scarlet fever, for a long time feeble and anæmic, or mentally feeble.

Chronic nephritis, protracted adenitis, or protracted endocarditis, may seriously interfere with convalescence.

Treatment.—The patients must be kept in one room, or one set of rooms, for three weeks from the beginning of the eruption. They must be kept in bed while the fever and constitutional symptoms continue. They are not to be allowed animal food until the completion of the three weeks. The rooms are to be kept well ventilated, the patient's skin must be washed every day with warm water and soap.

Excessively high temperatures may be reduced by antipyrine, antifebrin, or phenacetine.

The sleeplessness, restlessness, and cerebral symptoms may be alleviated by opium, the bromides, or sulphonal.

Special treatment may be needed for the pharyngitis, otitis, adenitis, or nephritis.

GERMAN MEASLES.

Rötheln. Roseola. Rubella.

It is possible that several different exanthemata, which we are as yet unable to distinguish from each other, are at the present time included under this one name.

The disease does not prevail as constantly as measles and scarlatina, but comes and goes at different times and in different places.

It is contagious from person to person, both in children and adults.

One attack of the disease protects against itself, but not against measles, or scarlatina.

German measles often precedes, or follows, epidemics of measles or of scarlatina.

The period of incubation is from one to three weeks, usually two weeks.

A period of invasion is absent altogether, or very mild, or lasts for twenty-four hours with constitutional symptoms. The patients have a febrile movement, headache, nausea, vomiting, conjunctivitis, pharyngitis, and swelling of the glands of the neck.

The eruption is in the form of pinkish macules, which are large and isolated, and resemble the rash of measles; or small and close together, and resemble the rash of scarlatina. In some cases the macules are changed to papules, and on the surfaces of these are small vesicles or pustules. The eruption is regularly the prominent symptom, altogether out of proportion to the constitutional symptoms. It appears on the face, body, and extremities, and lasts for from one to seven days. It often fades in one place before it appears in another. It is not usually followed by desquamation.

During the period of eruption there may be a little fever, a coated tongue, conjunctivitis, pharyngitis, swelling of the lymphatic glands in the back of the neck, synovitis of the smaller joints, inflammation of the muscles of the neck, bronchitis, or broncho-pneumonia.

The disease is not a severe one, and requires no treatment except for the alleviation of symptoms.

HOOPING COUGH.

(PERTUSSIS.)

AN infectious disease characterized by inflammation of the respiratory tract and a peculiar paroxysmal cough.

Lesions.—There is catarrhal inflammation of the nose, larynx, trachea, and bronchi, sometimes broncho-pneumonia.

The poison of the disease has not been demonstrated. It is apparently given off with the breath, floats in the air, and is taken into the bronchi.

The disease is contagious from person to person. One attack protects against subsequent exposure. It often accompanies epidemics of measles.

The period of incubation lasts for two weeks.

The invasion begins with the symptoms of the inflammation of the nose, larynx, trachea, and bronchi, in varying degrees of severity. The bronchitis is the prominent symptom. These symptoms last for one or more weeks before the appearance of the paroxysmal cough. This cough comes on in attacks, during which the patient holds his breath, and then takes a long inspiration with the characteristic stridulous sound.

In the mild cases the bronchitis is not severe, the paroxysms of cough not very frequent, and the patients suffer but little.

In other cases the paroxysms are so frequent and accompanied with so much vomiting, that the patients' health may suffer to a dangerous degree.

The worst cases are those which are complicated with broncho-pneumonia.

The disease lasts for from six to twelve weeks.

Treatment.—Inhalations of creosote, of carbolic acid, may be of service.

The bronchitis may be alleviated by the use of opium, ipecac, belladonna, or hydrocyanic acid ; or by counter-irritants applied to the wall of the chest.

Applications of cocaine to the nose may be of service.

Strychnia, conium, arsenic, quinine, the bromides, valerian, asafœtida, and chloral are given as empirical remedies.

Change of climate is often of great service.

MUMPS.

(Infectious Parotitis.)

An infectious disease characterized by constitutional symptoms and inflammation of the salivary glands.

Lesions.—Either one or both parotid or submaxillary glands are inflamed. The inflammation only goes on to the point of congestion and swelling of the glands. Occasionally the testicles, or the mammary glands, are inflamed in the same way.

The poison of the disease has not been demonstrated. The disease is contagious from person to person.

The period of incubation is from fourteen to twenty-one days.

The symptoms may begin with the constitutional disturbances, or with the inflammation of the salivary glands, or with both together.

The constitutional symptom are: fever, headache, nausea, restlessness, irritability, and prostration.

The local symptoms consists in the pain and swelling of the inflamed glands. With this there is often some pharyngitis.

The inflammation of the glands reaches its height in from three to six days, remains stationary for one or two days, and then subsides.

If only one parotid is inflamed, or if in both parotids the inflammation begin at the same time, the disease lasts about a week. If the parotids are inflamed successively, the disease is protracted for two weeks.

The complicating inflammations of the testicles or mammæ add very much to the discomfort of the patient, and protract the disease.

Most cases of mumps run a mild course. There may, however, be feeble heart-action, or excessive fever, or delirium.

Treatment is directed to the alleviation of symptoms.

HYDROPHOBIA.

An infectious disease belonging to dogs, foxes, and wolves, and sometimes communicated from them to man.

The poison of the disease exists in the saliva and the spinal cord. Its micro-organism has not yet been demonstrated. In man the disease is only acquired by inoculation from the bite of a rabid animal. In animals it appears to originate without discoverable cause. The disease may be given to animals experimentally by inoculation with the saliva or the spinal cord.

About half of the human beings who are bitten by rabid animals escape the disease.

Lesions.—The brain and spinal cord are found to be congested.

The period of incubation is from twenty to sixty days. There are histories of periods of incubation lasting for months, or even for twenty or thirty years. It seems probable that there is some error about these very long periods.

The invasion of the symptoms begins with a period of depression, during which the patients complain of headache, loss of appetite, stupor, restlessness, pain in the cicatrix of the bite. These symptoms last for one or two days.

They are followed by the convulsive period of the disease.

First, the muscles of deglutition are easily excited to involuntary and painful contractions. Then the muscles of respiration, and the voluntary muscles throughout the body, are affected in the same way. The saliva is increased in quantity, and the patients are constantly spitting it out. They vomit the little food they are able to swallow. There is venous congestion of the skin. There is violent delirium with hallucinations. The heart's action becomes rapid and feeble. The patients die exhausted in from one to ten days. The incessant convulsive movements and violent delirium give a terrible clinical picture.

Many of the symptoms of hydrophobia may be simulated by patients who do not have the disease.

Treatment.—The bite of a rabid animal should be at once excised, or freely cauterized.

During the period of incubation, inoculation with attenuated virus from the spinal cords of rabbits, after the method of Pasteur, has given good results.

During the convulsive period we do what we can with bromides, chloral, and opium to alleviate the symptoms.

TRICHINOSIS.

THIS is an infectious disease belonging to swine. It is due to the introduction into the body of a species of worm—the trichina.

In man the disease is acquired by eating swine's flesh which contains living trichinæ.

When flesh containing trichinæ is taken into the stomach, the trichinæ are set free and pass into the small intestine. There they become mature within two or three days, and the females bring forth living young five days later.

The trichinæ are of the shape of thread-like worms, male and female. The male are 1½ mm. long, the female 3 to 4 mm. long. The young are born alive on the seventh day after the ingestion of the flesh containing trichinæ.

The young trichinæ soon leave the small intestine, not remaining there for more than eight weeks, and find their way into the voluntary muscles. Here they increase somewhat in size and become enclosed in a connective-tissue capsule. Enclosed in this capsule, the worm remains quiet but alive for years. Finally it dies, and the capsule becomes thickened and infiltrated with lime.

The symptoms vary with the number of trichinæ introduced into the stomach and born in the small intestine.

A small number of trichinæ produce very slight symptoms.

A large number of trichinæ produce severe symptoms.

From a few hours to several days after the ingestion of the infected meat, there are disturbances of the stomach and bowels, pain, vomiting, and diarrhœa, with prostration.

About the tenth day begins the emigration of the young worms from the intestine and their lodgement in the muscles. While this is going on the muscles are swollen, contracted, tender, and painful; there is subcutaneous œdema in different parts of the body; there are irregular eruptions of herpetic, petechial, or pustular form; there is a continued fever with progressive emaciation; the patients pass into the typhoid state; there may be a complicating bronchitis or broncho-pneumonia.

The disease lasts from eleven to one hundred and twenty days. It is often fatal. In the cases which recover convalescence is protracted.

Treatment.—The preventive treatment consists in an efficient inspection of the muscles of all swine that are slaughtered, and in the thorough cooking of all swine flesh that is eaten.

During the first seven days after the ingestion of infected flesh it is possible to get rid of some of the trichinæ by vomiting and purging the patients.

ANTHRAX.

(MALIGNANT PUSTULE. MALIGNANT ŒDEMA. MILZBRAND.)

AN infectious disease belonging to cattle, sheep, and horses, and which is communicated from these animals to man.

The characteristic micro-organism is a bacillus which is found in great numbers in the blood, and which can be cultivated and inoculated.

These bacilli may live for a long time in the grass and on the surface of the ground. They may originate on marshy soils, or may be brought there by diseased cattle. Cattle acquire the disease from food and air contaminated with the bacilli.

In man the disease is acquired by inoculation, by inhalation, or by the alimentary canal. Inoculation is effected by handling infected hides, hair, wool, flesh, or instruments. It is said that it can also be done by flies and mosquitoes. The inhalation is of the dust from infected hides, hair, or wool. The introduction into the stomach of infected flesh can give the disease.

Symptoms.—The disease in man regularly follows one of three forms :

1. *Malignant Pustule.* This is the most common form. It is acquired by inoculation. There is a period

of incubation lasting from a few hours to fourteen days.

At the point of inoculation there is first a little swelling looking like a flea-bite, with a central black point. This swelling becomes larger, a vesicle is formed on it, then there is a central dry necrosis surrounded by a thick, swollen, red zone looking like a carbuncle, and around this the skin is swollen and œdematous. The general symptoms are developed from forty-eight to sixty hours after the appearance of the pustule. There are fever, prostration, and the rapid development of the typhoid state.

The disease lasts from two to thirty days. It is very apt to prove fatal.

2. *Malignant Œdema.* This is acquired by eating infected meat or breathing infected air.

After eating infected flesh, the symptoms begin in from eight to forty-eight hours.

The patients have chills, nausea, vomiting, pain in the abdomen, and great prostration. After hours or days, a subcutaneous œdema of some part of the body is developed.

This form of anthrax is very fatal.

3. *Intestinal Anthrax.* This is acquired by eating infected meat.

The patients suffer from prostration, pains in the head and limbs, pains in the abdomen, vomiting, bloody diarrhœa, rapid breathing, restlessness, stupor, convulsions, high or low temperature, bleeding from the mouth. In the more protracted cases, carbuncles are formed on the arms or head. This form of the disease is very fatal, the patients die in from one to seven days.

Treatment.—Preventive treatment is directed to cattle and sheep. Diseased animals are destroyed, suspected animals are isolated, and inoculations with attenuated virus have been practised with success on a large scale.

In the human being the only efficient treatment is that of the malignant pustule. This may be excised or destroyed by caustics.

GLANDERS. FARCY.

THESE names are given to an infectious disease belonging to the horse, ass, and mule, which is occasionally communicated from them to man.

Lesions.—There is a specific bacillus which can be cultivated and inoculated. There is a growth of granulation-tissue, in the mucous membranes, the lymphatic glands, and the skin. Little tumors are formed which soon degenerate and form ulcers. The mucous membranes of the nose, throat, and mouth are the seat of catarrhal inflammation.

In horses, the cases with much catarrh of the mucous membranes are called glanders; those with much inflammation of the lymphatic glands are called farcy.

In the human being, after inoculation there is a period of incubation lasting from three days to three weeks.

The disease runs an acute or a chronic course.

The patients suffer from headache, pains in the muscles, prostration, restlessness, sleeplessness, fever; they pass into the typhoid state, with delirium, stupor, a dry tongue, feeble heart-action, and diarrhœa.

At the point of inoculation a little tumor is formed, surrounded by inflamed skin. This soon degenerates and forms an unhealthy ulcer. Then the adjacent lymphatic vessels and glands become inflamed, little tumors are formed in the mucous membrane of the nose, mouth, throat, and skin. These tumors degenerate and form ulcers. There is catarrhal inflammation of the conjunctiva, nose, mouth, throat, larynx, and bronchi.

The acute cases run their course in from one to four weeks, and are usually fatal. The chronic cases last for several months, and recovery from them is possible.

The treatment is directed to the original tumor at the point of inoculation. If this can be excised or destroyed before the systemic infection has taken place, it is likely to abort the disease.

ACTINOMYCOSIS.[1]

THE disease belongs to the class of infective granulomata. It is a chronic inflammation excited by the presence of a special microphyte, with the production of new tissue composed of a stroma, round cells, epithelioid cells, and giant cells, which closely resemble tubercle-tissue. The new tissue forms tumors of varying size, which often degenerate and suppurate.

The disease has existed for a long time in cattle under a variety of names; it is only later that it has been recognized in human beings. It has also been observed in pigs and horses.

It is most frequently seen in young cattle between the ages of one and three years, but it may occur at any age.

It is probable that the micro-organism gains access to the system through wounds of the skin and mucous membranes, or through carious teeth. The cow-sheds, pastures, and drinking-tanks may be infected by the discharges from diseased animals.

Actinomycosis of the lips occurs in the form of rounded nodules, or flat, wart-like growths, or ulcers, or polypoid growths of considerable size.

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[1] Report of the Agricultural Department. London, 1889. Crookshank.

In the upper and lower jaws the disease seems to originate in carious teeth and then extend to the bone, which becomes the seat of chronic inflammation with enlargement.

The tongue is enlarged, is the seat of a diffuse inflammation, and is studded with nodules which may suppurate, or ulcerate.

In the pharynx the growth assumes the form of submucous, polypoid tumors. Similar growths are found in the larynx and trachea.

In any part of the body tumors may be found in the deeper layers of the skin, which may suppurate.

In the lungs are found nodules which look like miliary tubercles.

The actinomyces may be seen with the naked eye in the muco-purulent discharge, or in the scrapings from a growth. The tufts of the fungus vary in size from that of a grain of sand to that of a pin's head. They are made up of aggregations of club-shaped rods which form a sort of rosette. They may be calcified.

In the human subject actinomycosis affects the tissues of the mouth and neck and the jaws, producing lesions which come under the care of the surgeon; and the lungs and the gastro-intestinal tract, which come under the care of the physician.

Thirty-three cases of actinomycosis of the lungs have been collected by Dr. Hodenpyle, from which the following account has been prepared.

The ages of the patients varied from nine to sixty-three years; the majority of the patients were young adults.

The symptoms were those of a subacute broncho-pneumonia: cough and muco-purulent sputa, sometimes fetid, sometimes containing actinomyces; the physical signs of bronchitis and of consolidation of part of one lung; an irregular febrile movement, and progressive loss of flesh and strength. In some of the patients the formation of abscesses in the wall of the chest, so that they were mistaken for cases of empyema.

The average duration of the disease was ten months.

Lesions.—Usually only one lung is involved. The lesions are those of a broncho-pneumonia of peculiar form. The bronchi contain pus and actinomyces. Their walls are thickened by a growth of granulation-tissue, or by little abscesses. Polypoid growths of granulation-tissue project inward from the walls of the bronchi, and irregular masses of organized connective tissue are found in their cavities. The walls of the air-spaces are thickened, their cavities are filled with epithelium, or organized connective tissue. In some places are masses of granulation or connective tissue obliterating the air-spaces.

Diagnosis.—In all cases of broncho-pneumonia of irregular type the sputa should be examined for actinomyces.

Prognosis.—Nearly all the cases thus far reported have proved fatal.

Treatment.—The indications seem to be to use systematic inhalations of creosote, and to open and scrape out the abscesses in the wall of the chest.

ERYSIPELAS.

This disease is one which comes under the care of both physicians and surgeons. The surgeons see it as it follows injuries and operations, the physicians as it involves the skin of the face and other parts of the body, independently of injuries and operations.

The disease belongs to the class of infectious inflammations. Its micro-organism is a streptococcus which can be cultivated and inoculated.

It is communicated by inoculation, but the point of inoculation cannot always be discovered.

One attack does not protect against others, and some persons seem to be particularly liable, suffering from a number of attacks.

Lesions.—The characteristic lesion is the inflammation of the skin and subcutaneous connective tissue, with the growth of streptococci in the lymphatics. The skin is congested, swollen, and infiltrated with serum, or the inflammation may assume the purulent, or the gangrenous, character. The associated lesions are: acute pachymeningitis, thrombosis of the veins, acute inflammations of the mucous membranes of the nose, mouth, larynx, and bronchi, pneumonia, acute degeneration of the liver, spleen, and kidneys, pericarditis, peritonitis, abscesses in different parts of the body.

Symptoms.—The inflammation of the skin varies in the different cases as to its extent and severity.

It often begins in one ear, or on the side of the nose, and extends half-way or completely across the face, lasting for one or two weeks.

Or, beginning in the same way, it may involve the entire face, the scalp, the neck, and the upper part of the thorax, and then lasts longer.

The inflammations may only produce swelling and redness of the skin, or it may go on to suppuration, or necrosis.

The constitutional symptoms are only the mild fever and prostration which accompany a local inflammation; or the severe constitutional symptoms which accompany systemic infection. The condition of the patient will be made much worse by the development of any one of the complicating lesions already enumerated.

Treatment.—The general treatment consists in the nursing, the feeding, and the internal administration of large doses of the tincture of the chloride of iron. As local treatment we employ continuous cold, the oleates of mercury or carbolic acid, subcutaneous injections of mercury or carbolic acid, washes of lead and opium, of bichloride of mercury and opium, and of the acetate of alumina.

HYSTERIA.

A NEUROSIS, of which the symptoms are such as belong to disturbances of the functions of the brain, the spinal cord, the peripheral nerves, and the sympathetic system of nerves. These symptoms are of arbitrary, unreasonable, and transitory character.

In addition we have mental disturbances, disorders of digestion, genito-urinary symptoms, and changes in the composition of the blood.

Etiology.—The disease is much more common in females than in males. It is especially frequent between the ages of twelve and twenty years, but is also seen in childhood and in old age.

The hysterical disposition may be inherited or acquired. As exciting causes we find anæmia, disease of the uterus and its appendages, example and imitation, violent mental emotions, and overwork. It must be remembered that hysteria is often associated with other diseases, and that the symptoms may therefore be complex.

Symptoms. Disturbances of Sensation.—Undue sensitiveness to light, asthenopia, seeing objects which do not exist, temporary blindness.

Undue sensitiveness to sound, hallucinations of hearing, temporary deafness.

Perversions of taste and dislike of food.

Hyperæsthesia or anæsthesia of small or large areas of skin.

Headaches of all kinds, facial neuralgia, pain in the throat, pain in the larynx, pain in the mammæ, intercostal neuralgia; pain in the heart, in the stomach, the intestines, the ovaries, the bladder, the vertebral column, and the joints.

Motor Disturbances.—Irregular and spasmodic contractions of the muscles in different parts of the body. Contractions of the pharynx, with the "globus hystericus," regurgitation of food, inability to swallow, or cough.

Spasmodic stricture of the œsophagus. Spasmodic closure of the glottis, or laryngeal cough. Attacks of asthma. Contractions of the diaphragm with hiccough. Contractions of the intestines with pain. Retention of urine, or frequent and painful micturition. Spasmodic or continued contractions of groups of voluntary muscles. Several convulsions.

Paralyses of muscles in different parts of the body.

Tympanitic distentions of the stomach or intestines for short or long periods.

Paralysis of the pharynx and œsophagus, with inability to swallow.

Paralysis of the vocal cords, with loss of voice.

Localized paralyses, hemiplegia, paraplegia, or paralysis like that of peripheral neuritis.

Disturbances of the Sympathetic System.—Large or small areas of skin exhibit sensations of heat, or of cold, or are the seat of excessive perspiration. These conditions are due to contraction or dilatation of the blood-vessels.

The heart's action and the general circulation are often disturbed.

Anæmia is often present.

Digestive disturbances and symptoms are very common, and the nutrition of the patient may be very much impaired.

The urine may be diminished or increased in quantity.

Mental Disturbances belong to the more severe cases. The patients are excitable, peevish, bad-tempered, with a desire for notice and sympathy, with exaggerated likes and dislikes, with diminished will-power, with hallucinations, delirium, stupor, melancholia, or trance. The disturbed mental condition may pass into actual insanity.

There may be from time to time a rise of temperature.

Course of the Disease.—The predisposition to the disease is inherited or acquired. The symptoms of the disease occur in attacks, or are protracted for long periods.

Prognosis.—Many of the cases recover. Some remain in the hysterical condition nearly all the time; some become insane; some die in a condition of extreme emaciation, or with spasm of the glottis, or after general convulsions.

Treatment.—In the mild cases, with occasional and short attacks, such drugs as valerian and asafœtida are of service.

The more severe and protracted cases call for much judgment and skill on the part of the physician.

We must distinguish between the symptoms of the hysteria and those due to other diseased conditions.

The general rule is to try to improve the general health in every possible way, and to pay no attention to the hysterical symptoms.

Many of the cases must be taken away entirely from their relations.